Wildlife

IN AUSTRALIA

Vol. 12, No. 4 DECEMBER, 1975 60c

REGISTERED AT THE G.P.O. BRISBANE FOR TRANSMISSION BY POST AS A PERIODICAL

A MAGAZINE FOR THE ENVIRONMENT

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Printed by The Courier-Mail Printing Service, Campbell Street, Bowen Hills, Brisbane.

The Wildlife Preservation Society of Queensland is a non-profitmaking scientific and educational organisation centred in Brisbane. Through its official quarterly publication, WILDLIFE IN AUSTRALIA, it seeks to increase and disseminate knowledge of Australia's natural history, and in this way foster greater understanding of the urgent problems of conservation.

The Editor of WILDLIFE IN AUSTRALIA is constantly looking for articles and photographs on all aspects of nature and conservation in Australia.

At present no payment can be made for articles and photographs as all contributors give voluntarily their efforts for the cause of conservation.

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SUBSCRIPTIONS — within the Australian Commonwealth $2.40, Overseas $3.20 — payment to The Wildlife Preservation Society of Queensland, Box 2030, G.P.O., Brisbane, Q. 4001.

Membership of the Wildlife Preservation Society of Queensland is $5.00; husband and wife $6.00; life membership $100.00; and includes four issues of this magazine.

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Cover Picture

Anthocercis viscosa, a fragrant shrub from granite rocks of the Stirling District, and brought into cultivation at Kings Park Perth. The white flowers are a favourite lair of the spider.

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WILDLIFE AND ENVIRONMENT
Vol. 12, No. 4. DECEMBER, 1975

EDITORIAL

NO MORE NATIONAL PARKS?

Last year, the Australian Government gladdened the hearts of everyone interested in the environment by announcing a twenty million dollar three-year program of land acquisition for national parks, to be channelled through the National Estate body. Nine million dollars were allocated for 1974-75. The States submitted their proposals in January, many of them highly important.

But it was already too late. By the end of June little of the money had been spent. Land acquisition takes time and often long negotiation. Now the Budget has provided only $1.8 million under the program for this year. As for the original nine million, most of it has gone back into kitty — and not necessarily for national parks or conservational use, either, it seems.

This was a tragedy indeed. Many of the States' proposals were immediately endangered, and much land important for national parks may be lost altogether. Among others, the Little Desert in Victoria, the Myall Lakes and Violet Hill areas in N.S.W., rainforest areas in Queensland and the South Australian desert national park near Renmark may not be acquired at all.

We all know that every interest which suffered a cutback under the Budget has been making a fuss. But this is a matter that deserves all the fuss that can be made. We are losing so many chances of acquiring land to increase our miserable quota of national parks, and there is so much pressure for other uses of such land, that this particular cutback will mean we may never have a decent national parks system at all.

As we go to press, a double-dissolution election is pending. The environmental policy issued by the coalition parties appears to give some qualified support to the idea of providing money for States to buy National Park areas through the Heritage Commission. Whichever party is returned, we hope it will see the light in this matter.

Turn to page 115 for list of Donors to the Magazine Appeal.

What national parks we have are already being over-used in many cases, and they need much more intensive management and planning. Moneys for these purposes are also urgently needed.

The National Estate Report put very strong emphasis on the urgency of the need for national parks and the short time we have to get them. Did the National Estate Committee of Inquiry report in vain?

In this issue we are running articles on some areas in special need of protection and reservation. Without habitat, wildlife cannot survive, and with the removal of the Federal Grant for buying national park areas, many other important habitat areas will be lost to us.

The following are extracts from a 1974 submission prepared by the Bendigo Field Naturalists Club. It deals with this fascinating section of the mallee country in Victoria near the city of Bendigo.

1974 Submission for the Preservation of

THE BENDIGO WHIPSTICK

by The Bendigo Field Naturalists Club

This re-submission was compiled to bring to the attention of the authorities many aspects relating to the preservation of the Bendigo Whipstick which were not so apparent at the time of our earlier submission.

In fact the 1971 submission was mainly aimed at having reserved forest (which lies at opposite extremities to the Whipstick Scrub) declared Forest Park.

It is the central belt of Whipstick scrub that is of scientific interest and considered unique and which we were primarily concerned in preserving and retaining as one viable ecological unit.

Because the Crown lands were frozen awaiting investigation by the Land Conservation Council, any further action in 1971 could not have been anticipated, other than that of the Forest Park submission. However the Whipstick Crown lands and Forest Park are separated at several points by freehold land. Since 1971 there has been an increased exploitation of such lands, considered essential corridor or buffer areas, thus posing a serious threat to the future of this outstanding area.

Similarly it is feared that newer developers could move in on Crown land leases that have previously been judiciously operated. This raises serious doubts in our minds that the Crown lands utilisation is frozen in such a way that the flora and fauna and their habitat refuges will remain unviolated until the L.C.C. survey of the region as a **complete and single entity.**

We therefore request that all Government Departments and officers concerned do everything in their capacity to provide the necessary material action to save the Whipstick.

THE BENDIGO WHIPSTICK—ITS SIGNIFICANCE

With a population exceeding 46,000, the City of Bendigo is fortunately surrounded by a greenbelt of forest to the extent of 98,000 acres of reserved forest alone. The forests are well renowned for their floral wealth and bird life.

Within this area is a unique tract of mallee vegetation known as the "Whipstick Scrub". Originally encompassing some 70-80 square miles it has within the last decade been reduced to less than 50 square miles. Only about 25 square miles of mallee remain as public land, broken at several points by freehold land which is still being rapidly cleared.

At least two suggestions are feasible explanations of the origin of the name "Whipstick". One is that the slender springy eucalypt stems were much sought by pioneer travellers for use as whips for driving bullock teams through the area. The other is from the lashback that would have resulted from attempts to roll, flatten or cut the mallee scrub, or from pushing one's way through it.

This mallee vegetation is considered unique because it is adapted to Ordovician soils of age over 460 million years — the rocky clay soils of the goldfields. Most mallee vegetation is found on sands of a much younger age. Smaller satellite pockets of associated Ordovician mallee occur at Wychitella and Wedderburn, Inglewood to Kingower, Tarnagulla and Dunolly, and in Rushworth forest. They all have some individual characteristics and interest and are worthy of preservation in their own right.

The size of the Whipstick alone exceeds the total sum of all the other areas, as would its variety of floral species both showy and rare, numbering over 300. Its overall significance is further appreciated because of its close proximity — 5 to 20 miles from a major Victorian city. From Melbourne it is the nearest conveniently approached mallee association of any size.

Three mallee eucalypts (green, blue and bull mallee) form the main Whipstick association, with other shrubby species such as the broom honey-myrtle and the cross-leaf honey-myrtle.

A fourth species, the Kamarooka mallee in the northern areas is rare for Victoria and very restricted and localised in its other Victorian occurrences.

Adding further variety to the interest in the Whipstick, a Forest Park in the south from Eaglehawk to Huntly has a Red Ironbark/Yellow Gum association. It contains the wildflower species typical of the goldfields of Central Victoria, plus Whipstick mallee species from the large pockets of intruded green mallee. To the north near Kamarooka the other forest park area of grey box/yellow gum contains smaller intrusions of the mallee species including Eucalyptus froggattii. It also contains remnants of the Northern Plains flora with species such as the Quandong, Berrigan, Murray Pine, Turkey bush and three other Boobialla species, and a Cassia species.

Heavily eroded area beside Forest Park.

Regrowth area with single mature mallee tree indicating original height.

However the main belt of mallee country known as the Whipstick scrub is not within the forest park areas, separating them by several miles. Unfortunately the Crown lands of this Whipstick area are also broken at several points, and from the Forest Park, by freehold land which is being rapidly developed.

Whipstick Flora (approx. 300 species at 1974)

If for no other reason, the Whipstick is famous for its glorious displays of "Whirrakee wattle", a species that has only a restricted occurrence elsewhere. In the spring months dozens of other wildflower displays such as sticky boronia, mint-bushes and dampiera, rosy heath-myrtle, phebalium obcordatum and golden pennants are locally popular. It is a remarkable place where a sequence of rare species is distributed but often each in one restricted location only. Slender velvet-bush, Grevillea rosmarinifolia (green form); Westringia crassifolia, Phebalium obcordatum, Acacia flexifolia and slender mint-bush, are such species.

Virgin uncut 'bull mallee' — no erosion occurs in these areas.

Fauna

The surrounding forests of Grey Box and Yellow Gum-Ironbark associations into which pockets of mallee penetrate, together with compatible climatic conditions, make an ideal habitat for many species of birds, not normally found associated in the one area. (Birds 179 species, mammals approx. 10 species).

Nowhere else in inland Victoria will you find the intermingling of such a large number of species.

Thus it is reputed to hold one of the highest concentrations of song-birds in Australia. The crested bell-bird, purple-gaped honey-eater and shy ground-wrens are rarer birds having strongholds in the Whipstick.

In fact the Whipstick appears to be the southern limit of the range of many birds normally found only further northwards, and conversely, the northern limit of range of many southern species of birds. Northern species such as the Ringneck Parrot, White-breasted Woodswallow, Crested Pigeon, Shy Ground-wren, White-fronted and Purple-gaped Honeyeaters, Gilbert Whistler, Diamond Dove, Spotted Nightjar etc., are seldom found very far south of the Whipstick. Likewise, birds normally from southern districts such as Rufous Fantail, Brush Bronzewing, Pink and Rose Robins, White-backed Magpie etc., are rarely seen to the north of Bendigo.

Mallee-fowl

A former occurrence of the Mallee-fowl (normally a bird of Mallee sands) on the Ordovician Whipstick Mallee was unique, with only a few birds surviving today in similar habitat at Wychitella.

In the Whipstick it is now thought to be extinct (not sighted since the late 1920's), but at least 20 old nesting mounds are known, many still existing in good condition. There are certainly not enough areas set aside for the survival of this bird, and an area suited for its re-introduction must at all costs be preserved. This then would be the nearest mallee-fowl habitat to Melbourne.

Animals

Animals such as kangaroos and black scrub-wallabies are found in the region, but it has no great wealth of mammal species. It is thought that activities in the 1800's of the mining era, forestry and eucalyptus cutting and early fires combined to destroy habitat necessary for smaller marsupials which have never returned. The echidna, possums and tuans, and the fat-tailed marsupial mouse are known for the area.

Yellow-footed Phascogale (*Antechinus flavipes*) was recently trapped in the Whipstick by our Mammal Survey Group.

Machine-harvested area. Sheet erosion is heavy and long-term effects unknown.

History

Steeped in history, with surviving evidence of gold mining and puddling machines, old hotels and wine shanties, the Whipstick has many mysteries and legends pertaining to these past eras. An impressive list of Whipstick gold nuggets is recorded, and other historical events are being published in The Bendigo Naturalist, the official magazine published by the Club.

Old Eucalyptus factory sites dot the landscape and some of note are still operative. As such they were of historic interest and the harvesting methods were selective and considered beneficial to the floristics of the area. Eucalyptus oil from a peppermint type Eucalypt at Sydney was Australia's first export product to England in 1788/1790 and Baron von Mueller was later instrumental in starting the industry off. The Whipstick is one of the last strongholds of this fascinating industry.

Unfortunately modern utilisation techniques involve machine harvesting at ground level at more frequent intervals over vast areas, proving environmentally disastrous.

1970 In 1970 a Whipstick seminar was organised in conjunction with the Bendigo Jaycees Conservation year program. Conservationists from all over Victoria attended as did local organisations and "Landholders". A four point plan was adopted as follows:—

that (a) The Whipstick Crown Lands be immediately set aside as a National Park at the same time safeguarding the rights of Eucalyptus harvesters to operate within its boundaries under conditions to be agreed upon.

(b) That the surrounding state forests (north and south) be added to the national park if forestry in these areas ceases; that the Forestry Department be urged to declare such areas a forest park until this time, and that the land be not leased for grazing, and where a lease already exists, that it be revoked on expiration.

(c) That tactful attempts be made to procure any privately owned blocks that may be necessary to give a complete, unbroken viable ecological unit, or blocks that may contain worthy species not well represented within the crown lands or state forest; if the owner is agreeable.

(d) That attempts be made to encourage the continuation of the Eucalyptus Industry on private lands, in preference to cultivation of such lands, as this land will act as a buffer zone to the national park, and may in time be added to it.

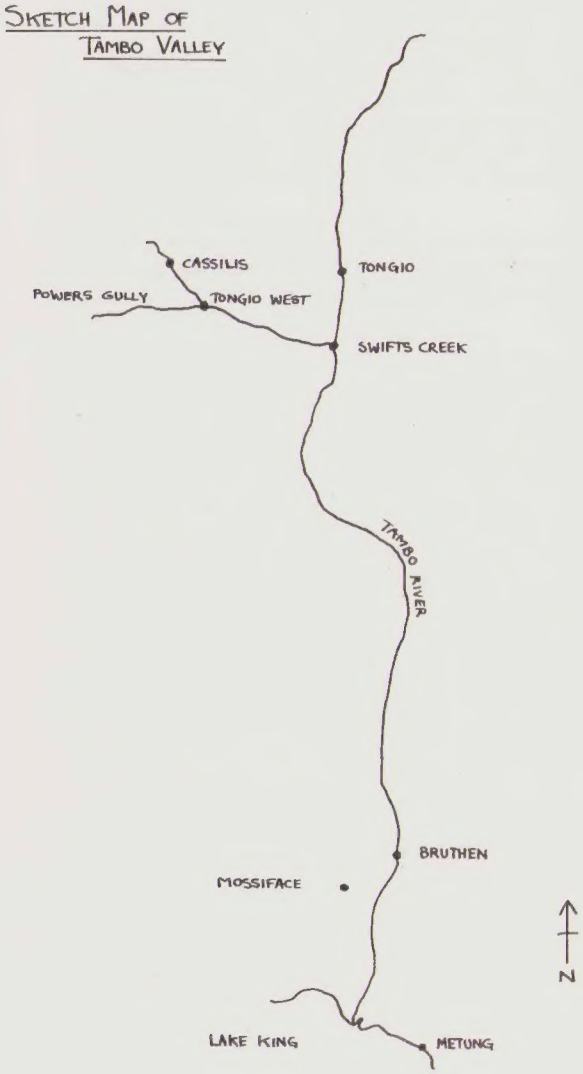
Dominant "Whipstick Scrub" species

Whipstick mallees
- Green mallee — *Euc. viridus*
- Blue mallee — *Euc. polybractea*
- Bull mallee — *Euc. behriana*
- Kamarooka mallee (or black mallee) — *Euc. froggattii*
- Broom honey-myrtle — *Melaleuca unuinata*
- Cross-leaf honey-myrtle — *Melaleuca decussata*
- (Totem-poles)

Slaty sheoke — *Casuarina muelleriana*
- Whirrakee wattle — *Acacia williamsonii*

THE ENVIRONMENTAL EFFECTS OF GOLDMINING IN THE TAMBO VALLEY

by P. D. GARDNER



The Tambo Valley from Tongio down was mined extensively (alluvially and reef) for more than sixty years.

Three distinct environmental questions arise from the activities of the miners:

1. The destruction of the forests.
2. The residues left from the processing of ore and
3. The combined effects of the removal of timber and the turnover of ground in the alluvial process.

FOREST DESTRUCTION

Recent debate (Wildlife letters June 1975) has referred to comparisons of the practice of clear felling and the denudation of timber by miners. The comparison is not valid unless an allowance is made for other variables such as altitude, rainfall and original vegetation.

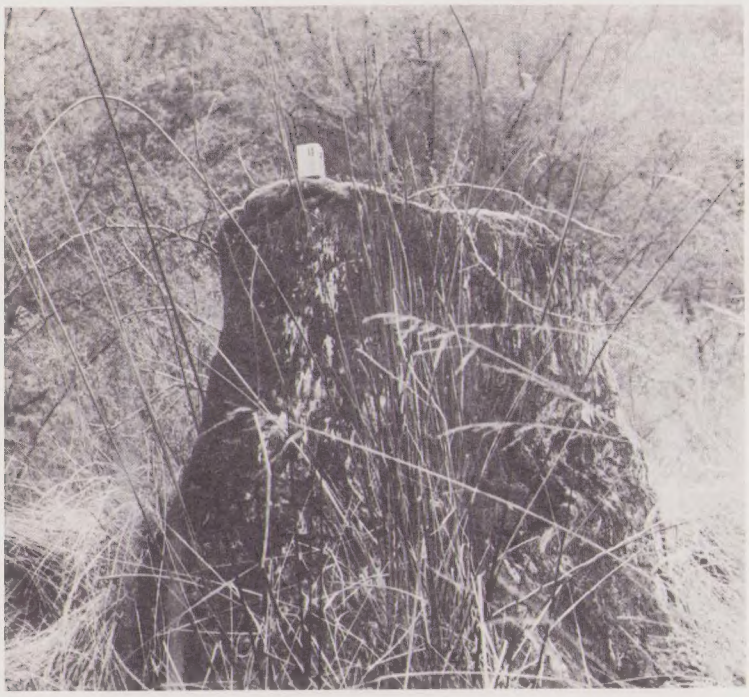
Miners denuded the hills around the old gold towns of Cassilis and Tongio West. The timber was used to power steam engines that drove batteries and other mining plant. Illustrations of the Queen Cassilis Mining Company's recovery plant show long stacks of timber billets six feet high. This company so denuded the countryside that they were forced to build the first hydro-electric plant in Victoria at exorbitant cost. All that remains of this large company's plant is the heaps of chemically treated ore residue on which nothing grows.

In the space of sixty years it appears that the original species have regenerated (grey box — stringybark) in most areas. However some areas have thick undergrowth, black wattles and small shrubs. Also the size of some of the stumps left in this country seems to indicate that it could take many more years for the bush to return to its pre-mining condition.

MINING RESIDUES

Both mercury and cyanide were used in the gold recovery process. Local 'rumour' has it that barrels of cyanide concentrate were buried in the dumps at Powers gully. A by-product of the local ore was arsenic. A band of this is exposed in the bank of Greys Creek

An invasion of blackberries covers a cleared area with regrowth in the background. Power's Gully.



A stump near Queen Cassilis Mine with secondary regrowth. A 35mm film box indicates its size.

by the Cassilis Battery site. One local farmer lost several head of cattle when they licked this band of salts. No tests to my knowledge have been made for these residues in any of the local streams.

COMBINED EFFECTS OF REEF AND ALLUVIAL MINING

Before the onset of mining the Tambo River in the Swifts Creek-Ensay-Tongio region was a slow meandering stream with large deep pools and billabongs. The combined effects of mining and the clearing of land for farming has drastically altered the character of the river. With the clearing of land must have come an increased run-off of water, coupled with a large increase in erosion.

Today the river is a small fast flowing stream lined for much of its way by basket willows. It is slowly eroding the valley floor. Places like the Swifts Creek Swamp have disappeared.

On the lower reaches of the Tambo small steamers used to travel upstream from Lakes Entrance to the port of Mossiface near Bruthen with goods for the gold fields, returning with a cargo of hops from the Bruthen flats. The river was deep to this point and quite navigable.

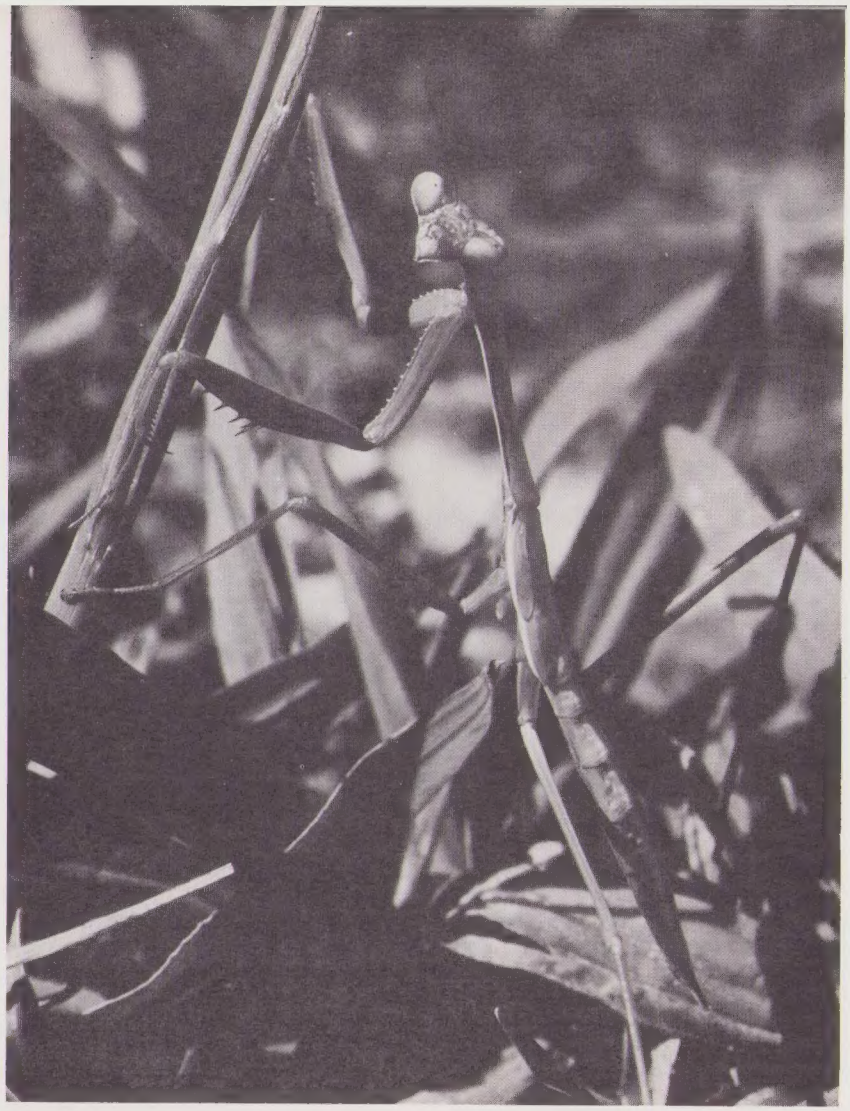
With the increased run off and erosion from the upper parts large amounts of sediment were carried downstream to be dumped in the lower parts of the river. It remains an academic question whether the river trade died because of the silting up of the streams or through the improvement of other forms of transport.

Thus although the forests have regrown other deleterious effects of the clearing and mining remain, the loss of deep rich alluvial topsoils, and the silting up of the lower reaches of the river.

The old Tambo River course at Mossiface.

MY FAVOURITE PICTURE

Bruce Cowell of Brisbane sent us this study of a Praying Mantis (*Archomantis latistyla*), clearly showing the interlocking spines on the forelimbs which seize and hold their prey, and the mobile neck which marks out the mantids among other insects, allowing it to turn its head to watch movement.



MAGAZINE APPEAL

Our continuing appeal for funds to keep the magazine's price within the reach of subscribers is meeting a good response, and we list the names of recent donors below. But with the continuing rise in costs and postage, we will go on needing your support.

We quote one letter from a donor —

"It will be a blow to conservation if "*Wildlife in Australia*" speaks with a weaker voice... There are other ways to help the magazine too. Readers could (with permission) leave a sample copy in their local library, doctors' and dentists' waiting-rooms. Try to influence a friend to subscribe to *Wildlife*. (If you are using an older magazine, mark the current subscription price). Perhaps if we put ideas to work we can all help to benefit the conservation magazine "*Wildlife in Australia*" ".

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THE WESTERN AUSTRALIAN BOTANIC GARDEN

by P. R. WYCHERLEY, Director, Kings Park and Botanic Garden

Kings Park goes back to the foundation of the Swan River Colony in 1829. The following year the Surveyor General, John Septimus Roe, refused permission to cut timber on Mount Eliza because the land was needed for public recreation. He probably intended also to protect the spring at the foot of Mount Eliza, which was the first source of sweet water for the original settlers of Perth. In 1872 a reserve of 175ha was gazetted as a public park on Mount Eliza and along the scarp overlooking the Swan River. In 1890 it was extended to approximately the present area of 403ha. A Board was appointed in 1895 to manage Perth Park as it was then named and development began. The first President of the Board and Premier of the State, Sir John (later Lord) Forrest, planted the first tree, a Norfolk Island Pine. The bushland, which still occupies the greater part of Kings Park, was naturally self sown. Although an avenue of West Australian red flowering gums was planted in 1898, most of the early plantings were of species which were not native in Western Australia. Some fine specimens of Moreton Bay fig date from this period. Selections have since been made of the valuable fodder tree, the carob or Mediterranean locust, planted in the early days.

English oaks and planes only did well where there was a high water table or if irrigated through the hot dry summer. Pines from California and the Mediterranean did better. The sugar gum was one of the East Australian species able to adapt in the sandy soils, where the eucalypts occurring naturally were marri, jarrah and tuart, the last being restricted to old dunes over limestone. The West Australian peppermint occurs naturally on old dunes often in association with tuart. The peppermint was planted and grew well in avenues and elsewhere in the park, running wild locally where it had not been seen before in living memory. The east Australian kurrajong has also run wild from the early introductions.

The name was changed to Kings Park in 1901 in honour of King Edward VII. A second avenue of red flowering gums was planted in 1929 to commemorate the State Centenary, but by 1934 most trees in both avenues were suffering badly from patch canker. The main avenue was replaced with lemon scented gums from Queensland in 1938. The State War Memorial was erected also in 1929, but most of the trees, palms and shrubs used to landscape the surroundings were exotic.

Interest in native species revived after the appointment to the Board of Mr S. L. Kessell, Conservator of Forests in 1932. Australian — mainly Western — trees were planted in an experimental arboretum in 1936 and received the minimum watering during establishment. At the same time the collection of wildflower seeds and their donation to Kings Park for trial planting was encouraged. The Rottnest daisy now self sown along the scarp face may have been established in Kings Park then. Nevertheless the planting of wildflowers for bush enrichment was not as successful as the planting of trees by Mr J. E. Watson, Superintendent from 1938 to 1962.

Nowadays the cultivation of native species is enjoined almost fanatically and planting of exotics is condemned. However, beauty and utility in plants do not follow State boundaries and the earlier work up to 1959, when it was decided to establish the Western Australian Botanic Garden in Kings Park, should be viewed in perspective. The development of the park until then, including many trial and error plantings of native and exotic trees, was part of the horticultural history of Perth and environs, finding out which trees would grow on the sandy soils and under the strongly seasonal climate (moist cool winters and hot dry summers) with or without irrigation. Moreover this demonstrated the growth and form of the trees for landscapers to see. Thus one of the functions of a Botanic Garden was performed, even if unconsciously, in the efforts to landscape the park economically (money has always been one of the limiting factors).

The Botanic Garden

The construction of the Botanic Garden in Kings Park began in 1962. It was necessary to decide the policy and nature of the Botanic Garden. Some decisions seem unfortunate when viewed in hindsight. Indeed it has been suggested that the State Botanic Garden should never have been located in Kings Park at all, because it has only very sandy, strongly drained, infertile and generally intractable soil. On the other hand the setting overlooking the Swan River and the City of Perth is magnificent and attracts many who might not otherwise visit a botanic garden.

It was decided not to enclose the Botanic Garden or even a portion of it, because public opinion was still sensitive to any restrictions on free movement throughout Kings Park at all times after a proposal to build an aquatic centre had been quashed by Parliament. The lack of any enclosure has made it impracticable to display rare species which must be secured from theft or to have public glasshouses for plants which cannot be grown in the open. Also the control of rabbits without risk to the public or cruelty to the rabbits is very difficult in an open garden.

The major decisions were, firstly whether the Botanic Garden should concentrate on the native West Australian flora or should endeavour to display as diverse a collection as possible with representatives of the flora of the whole world, and secondly if the Botanic Garden should be merely an embellishment and public amenity, or become a scientific institution with cultural, educational and research functions to complement the work of the Western Australian Herbarium and Museum.

A red wattlebird photographed in the Botanic Gardens in Kings Park. The wealth of flowers in this garden attracts many nectar feeding birds.

The West Australian Christmas Tree. It was found that couch grass will serve as a host for young seedlings of this root parasite.

Pioneer Women's Memorial in the Botanic Gardens with everlastings and red and green kangaroo paw, the Western Australian floral emblem in the foregound.

The Kings Park nursery display in the Wildflower exhibition. These are container grown black kangaroo paws; the local blackboy, *Xanthorrhoea preissii;* the golden morrison, *Verticordia chrysantha* and other native species.

Red-flowering gums in the Botanic Gardens with the city of Perth in the background.

Colour variants of the tree kangaroo paw, *Anigozanthos flavidus*.

The Native Flora

The Botanic Garden in Kings Park does concentrate on the native flora, but neither for narrow chauvinistic reasons nor to the total exclusion of all exotics. There are about 6,500 species of flowering plants native in Western Australia. Relatively few had been cultivated extensively in the past, such as half a dozen of the hundred or more everlastings and related annuals, and one or two eucalypts including the river red gum widespread in Australia and frequently planted overseas. More cogently there are 3,600 species native in the South Western Botanical Province (cut off by a line roughly from Shark Bay to Israelite Bay) in which Perth lies, moreover 2,400 of these are endemics; that is they do not occur naturally anywhere else in the world. Agriculture, drainage and reclamation of wet lands, urban and industrial development, modified forests and indiscriminate burning for fire control, all these reduced the natural habitats available to the native flora, in some cases to the point of total destruction. Hardly any of the endemics had been cultivated.

Therefore priority was accorded to native West Australian plants because they were neglected previously and contributions towards their conservation were urgent. Exotics and East Australian plants were not abandoned. The living collections of them already planted in Kings Park were maintained, indeed they benefited from the better care available. Small sections of the Botanic Garden are devoted to eastern states plants and the floras of California, South Africa and the Mediterranean, that is the principal regions with a similar climate to that of Perth. Many of these plants are locally useful horticulturally. Also they extend the educational value of the Botanic Garden by displaying the botanical relatives and ecological equivalents of our own flora.

The primary role of botanic gardens in the conservation of the native flora is not to preserve in cultivation species threatened with extinction in the wild. The best way to preserve threatened species is to establish adequate protected reserves of their natural habitats. A species is biologically a range of genetic variation and a component of a community or communities. Preservation in cultivation leads to genetic erosion and the selection of forms adapted to cultivation but not to survival in nature. The breeders of cultivated plants need constant recourse to wild material to restore variability and resistance to pests and disease.

Therefore even if it was possible to cultivate representatives of every species in botanic gardens this would not be conservation of the species biologically. In practice it is not yet known how to cultivate every flowering plant, let alone the lower plants. Some groups such as the terrestrial orchids are difficult to cultivate and more research is needed. Preservation by cultivation is a last resort when the known habitat of a rarity is about to be destroyed, if this is realised in time for effective action.

Nevertheless one of the objects of Kings Park is to grow as many native West Australian species in the Botanic Garden as possible, preferably raising them from seed or if that fails multiplying the plants by cuttings or other vegetative means. Transplanting whole plants from the wild into the garden, which involves reduction of the wild population, does not qualify as cultivation of native plants. In the course of bringing plants into cultivation certain aspects of their biology must be investigated, for example the specific conditions for seed germination. Such information can be fed back into programmes for the management of reserves to save the species in the wild. It is learnt too that the natural reproductive capacity of some plants such as verticordia species or black kangaroo paw is very low, their local abundance in the wild is deceptive. The prognosis for their survival is poor unless protected from further habitat destruction and over-exploitation for commercial purposes.

Many of these plants or parts of them, such as seed for propagation or flowers, fruit and foliage for ornament, are in great commercial demand. If these requirements continue to be met by collecting these materials from wild sources, which are already dwindling, the ability of these attractive plants to reproduce and survive in competition with natural vegetation will be progressively reduced to extinction. The growing of native plants in botanic gardens demonstrates that cultivation is a feasible means of meeting these commercial demands and that legislation prohibiting collection of wild material would be justified. Although this would halt the present commercialisation of wildflowers, it could lead to the development of a profitable growing industry and trade.

The Botanic Garden is an attractive embellishment and those who visit it or the Wildflower Exhibition staged each spring may come firstly to enjoy a beautiful amenity. However, they have opportunity to realise what a rich and varied flora there is in Western Australia, where more than 80% of the total population is classified as urban, three-quarters of whom live in the Perth-Fremantle Metropolitan region. Few suburban gardens grow native species, but they can see 1,200 native species growing in the Botanic Garden, or about 2,000 displayed at the Wildflower Exhibition, for which about a quarter of the species are grown in containers in the nursery. So the Botanic Garden is an educational and cultural institution awakening the public to what there is to conserve. The living collection is of obvious value for all studying botany in school, university or training college, as well as for those who have a private scientific or an applied interest, such as landscaping.

Scientific Research

The decision to engage in scientific research was a natural consequence of the decision to specialise in bringing the native flora into cultivation. In order to avoid undue overlap with the functions of the existing Western Australian Herbarium, the research role of Kings Park and Botanic Garden has been defined as the investigation of the biology of native plants. This includes the immediate practical problems, such as seed set, germination and nutrition, encountered in growing native plants, and also the secondary problems such as the breeding and selection of cultivars of enhanced ornamental value better adapted to cultivation in such characters as colour, prolific flowering, habit (dwarf or creeping forms are useful ground covers) and

resistance to pests and diseases (remember the patch canker on the red-flowering gum). Two-thirds of Kings Park is still bushland and the investigations into native plant biology include research into management of recreational bushland. This type of urban or suburban parkland will grow in importance as the shortage of water for conventional parks gets worse in the cities. It is not enough to leave the bush to look after itself, at least not when there are 5 million visitors each year, an average of 14 fires lit deliberately or accidentally each year, and invasions of several alien weed species, notably veld grass which chokes out the native species and adds fuel to the fire risk.

In the present circumstances horticultural and applied ecological investigations have priority, but the programme provides for research of a more fundamental character. The biology of a plant embraces all its relationships which account for its place in nature. Biology in this sense is sometimes called natural history or autecology. Learned societies and institutions in some countries (e.g. Great Britain) have begun the preparation and publication of a Biological Flora consisting of a series of monographs each describing one (or a few related) species in great detail. The treatment of each species in a Biological Flora is far more intensive than in a taxonomic flora or identification manual. In practice fewer species can be dealt with in a biological than a taxonomic flora. The information now being obtained at Kings Park will contribute to studies of species for a Biological Flora of Western Australia. Unfortunately this work is not progressing as fast as the unique flora deserves. Nevertheless a start has been made.

Shortage of funds and hence staff curtail other much needed services, especially in the advisory or educational sectors. More requests for advice on the growing of native plants or for information on their biology are received from schools and the general public than can be dealt with adequately by the existing staff experienced in the relevant fields. Even so a foundation has been laid. A Western Australian Botanic Garden has been established in Kings Park to specialise in the cultivation of the native flora. Research has begun. The expansion of these existing commitments and the provision of better advisory, cultural and educational services to the public will depend on governmental support stimulated by public demand.

Red-flowering gum — *Eucalyptus ficifolia*
Moreton bay fig — *Ficus macrophylla*
Carob — *Ceratonia siliqua*
Sugar gum — *E. cladocalyx*
Marri — *E. calophylla*
Jarrah — *E. marginata*
Tuart — *E. gomphocephala*
W.A. peppermint — *Agonis flexuosa*
East Australian kurrajong — *Brachychiton populneum*
Lemon-scented gum — *E. citriodora*
Rottnest daisy — *Trachymene caerulea*
River red gum — *E. camaldulensis*
Black kangaroo paw — *Macropidia fuliginosa*
Veld grass — *Ehrharta calycina*

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OUR NORTHERN HERITAGE'

NORTH QUEENSLAND — LOVELIEST OF OUR THREATENED AREAS — NEEDS TO UNDERSTAND ITS PAST AND ITS CHOICES FOR THE FUTURE.

The Wildlife Preservation Society of Queensland plans a two-week program, July 3-18, 1976, in the Cairns area. Lectures, discussions and excursions will be held to:

- ☆ **Help North Queenslanders identify those parts of their environment which are part of the Australian Heritage, including both natural and cultural environments, as indicated in the Report of the National Estate, 1974.**
- ☆ **Explain and display to visitors some of the things on land and sea which make North Queensland so beautiful and interesting, and one of the areas most worthy of conservation in Australia.**
- ☆ **Provide material for a publication on Queensland's northern heritage (from Townsville to Cape York) to coincide with Cairns Centenary Year 1976.**

Organised trips near Cairns, on the Atherton Tableland, and to Michaelmas Cay on the Barrier Reef will study wildlife, vegetation types, historical sites, Aboriginal sites and art, and natural and man-modified landscapes.

Lecture and discussion sessions at Cairns and Tinaroo will be open to the public. Numbers on the excursions will be limited and preference will be given to members of major conservation societies.

From 3rd to 11th July an organised program of talks and trips will include speakers such as David Yencken (chairman, Australian Heritage Commission), Peter Forrest (National Trust of Queensland), Judith Wright, well-known ecologists such as Dr J. Kikkawa, Dr Len Webb, Geoff Tracey, Peter Stanton and various local experts. Final program of speakers and subjects will be available later.

From 12-18 July special excursions will be held, to be arranged on the basis of requests from those enrolling in the program, to such places as Lizard Island, Cooktown, Chillagoe, Daintree, Quinkan Country.

Visitors from the south will be welcomed. Our guest of honour will be Miss Phyllis Busst of Victoria, founder of the Busst Fund.

Accommodation to suit a variety of pockets will be organised.

A detailed program will be made available to those who indicate support and attendance.

Preliminary inquiries should be made to

The Secretary,
Wildlife Preservation Society of Queensland
(Cairns Branch), P.O. Box 1350, Cairns 4870.

Books Worth Reading

GUIDES TO TWO NATIONAL PARKS

Wilsons Promontory National Park by Sue and John Brownlie, published by Algona Guides, 2nd edition 1973. Mt. Buffalo National Park by Sue and John Brownlie, published by Algona Guides, 1972. Reviewed by Napier Mitchell.

How often in recent years has one searched in book stalls for some detailed guides to our National Parks? Yet in most cases the only finds are the large generalised books that cover a number of National Parks, and would take up much valuable room in the haversack even if they were useful.

Coffee table books, of course, have their place; for where else would the average family tourist be able to see in full colour the beauties of an animal or bird that would normally elude such close observation?

These pocket sized Algona guides written by the Brownlies are not coffee table publications. There are a few superb photographs, but their main value is in their text. Both are full of fine, practical details for the visitors to the park interested in an introduction to its natural history.

In a light and interesting style the Brownlies take the visitor along roads, tracks and trails introducing the flora and fauna without the turgidity of scientific prose.

A brief description of the park is followed by a history of the area. Those who have perhaps tended to think of the conservation fight as a relatively recent innovation will be surprised at the reference to a deputation led by Professor Baldwin Spencer to oppose a land development scheme in the Wilsons Promontory area in 1904.

Common wombat (*Wombatus urinus*).

Mt. Buffalo National Park — snow gums and granite boulders.

A section of each book is devoted to the physical features of the park, introducing the visitor to the basic geology and landform features.

The major plant species are described in a section covering plants (and ecosystems in the case of the Mt. Buffalo booklet). More importantly from the visitor's point of view, direction on where to find the most interesting plants is offered. Furthermore, you don't need a botany degree to follow the descriptions. Unfortunately for the budding plant specialist the drawings accompanying the plant are of more artistic than taxonomic value. However such enthusiasts can easily find more detailed works if they need them. A very interesting and valuable section on Lichens is included in the Wilsons Promontory booklet.

Mammals and birds are covered briefly in respective chapters. A list of common birds is provided in the Mt. Buffalo booklet, and presumably a more complete bird list in the Wilsons Promontory guide.

Reptiles also earn a brief chapter in both books and an interesting section on shore life is provided in the Wilsons Promontory guide.

To many, the track notes, which provide approximate journey times and describe the main features of the natural history on the route will be the real value of the guides. Few parties are equipped with amateur naturalists, and perhaps nothing else enriches a visitor's understanding of a national park, and the conservation ethic, as much as the self-discovery of the natural history, made so much more possible by handbooks such as these. Track notes are supplemented by maps which should provide enough detail for the trails described.

A special section on ski touring and climbing will also serve as an introduction to the new visitor to Mt. Buffalo National Park.

A section entitled "National Parks and Private Developers" in the Mt. Buffalo guide describes some circumstances surrounding the use of this park which have become too much a familiar pattern in park use in Australia.

Finally there is a paragraph devoted to the addresses of Victorian Conservation Societies and another on sources of information which could prove useful to readers seeking more detailed knowledge.

Unfortunately the sources of information are inadequately referenced with publishers' names, dates and such relevant material are missing. Many people will no doubt be annoying their librarians or booksellers in trying to find some of the sources. Please, writers of such works, reference this material properly so the sources can be traced!

Sue and John Brownlie have provided a valuable contribution to a field that is so sadly lacking in Australian natural history publications.

There is a very real need for many more such guides. Perhaps the Heritage Commission or some such body can be persuaded to help finance more such publications to cover, eventually, all of our National Parks and Reserves.

Little penguin (*Eudyptula minor*), a common visitor in spring and summer to coastal parks.

Wedge-tailed eagle (*Aquila auda*).

Spiny ant eater (*Tachyglossus aculeatus*),
(All photographs by the Brownlies.)

"THE WORLD OF OLEGAS TRUCHANAS"

This magnificent book sold out of the first print of 6,000 copies in one week. A reprint, of 4,000 copies only, was due in September (price $22.50, postage $1.00) and could be obtained from O.B.M. Pty. Ltd., The Book Arcade, 36 Elizabeth Street, Hobart (G.P.O. Box 97A, Hobart 7001). About a thousand copies were put aside for booksellers on the mainland. If you haven't been able to obtain your copy, it may be because of the very rapid sales of the book.

BREEDING ENDANGERED SPECIES IN CAPTIVITY — ed. R. D. Martin

420 pages. *Academic Press, London.* **1975**

Recommended Australian price **$33.75**

Most conservationists now recognise the value of zoos for breeding and conservation of endangered species of wildlife. This book brings together the papers presented at the 1972 Conference on the Breeding of Endangered Species, describing world-wide work with a wide range of species. The detailed accounts of management, feeding, disease and other problems show clearly why so many attempts at breeding in captivity have failed.

Several papers are of particular interest to Australians. Dr. H. R. Bustard summarises the requirements for the breeding of crocodiles. For some time, the parma wallaby (*Macropus parma*) was considered to be extinct, but in 1967 it was found in New Zealand, and later a few were found in several localities in New South Wales. Animals from New Zealand have been used for breeding at the Healesville Sanctuary and Monash University. Reproductive data from the latter are given. R. Strahan (Director of Taronga Zoo and Aquarium) summarises the risk of extinction of many marsupials, and also states that the echidna and platypus are in no danger. He also gives notes on the feeding and environmental requirements of many species. The breeding of the eastern native cat (*Dasyurus viverrinus*) at the Melbourne Zoo is described.

The book has a comprehensive list of references and index, and useful photographs and maps. At the price, it is not likely to be bought by many individual conservationists, but should be held as a reference work by conservation bodies and zoos where animals can be bred.

Our copy is from the publishers.

REPTILES AND AMPHIBIANS OF AUSTRALIA —

A. H. and A. W. Reed Pty. Ltd. Price **$23.95**

Australia has lacked a thorough and well-illustrated reference book on reptiles and frogs — some of the richest and most diverse of our fauna. Dr. Harold Cogger has now filled this gap with conspicuous success. His book covers frogs, crocodiles, turtles, tortoises, lizards and snakes, and with nearly 800 photographs of which nearly 200 are in colour, and very clearly set out identification keys, distribution maps etc. and line drawings, we now have one of the world's most impressive volumes on the whole Australian herpetofauna. Few countries could be better served and this volume is essential for all biologists, libraries and people wishing to identify species.

The David G. Stead Memorial Wildlife Research Foundation, Box 4840 G.P.O., Sydney 3001, sends us this information:

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No. 2 MINTBUSHES AND THEIR RELATIVES: Descriptive notes on the members of this attractive family... Prostanthera, Westringia, Ocimum, Hemigenia, Hemiandra, Microcorys, Basilicum, Ajuga, Mentha Teucrium and Wrixonia with notes on their culture and tastes in habitat.

No. 3: MAT AND GROUND-COVER PLANTS: Descriptive catalogue of these important plants for all gardens. Notes on climatic tastes and adaptability. A wide range of species for all habitats.

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NO. 5: Out of print.

No. 6: CALLISTEMONS AND OTHER BOTTLEBRUSHES: Descriptive notes on Callistemons including a number of recently recognised forms and hybrids; Calothamnus, Kunzea baxteri, Bottle-brush-like Melaleucas and Regelia velutina.

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TEACHERS PAGE

Fun and Games

All work and no play makes Jill a dull girl (and Jack a dull boy of course). Teachers should not neglect the play aspect of environmental studies. In play, many mammals and birds learn how to handle problems of adulthood, and the same applies to humans. There is a wide variety of games which can be played at all levels of kindergarten, primary and secondary school.

COMPETITIONS

Sketching games.

Jumbled names. One person or a group could produce a number of jumbled names of common animals, for example 'renw' for 'wren'. The winner would be the one who completed the correct names most quickly.

Similarly the name of an animal could be concealed in a sentence by joining the end of one word with the beginning of the next. For example — the murky water attracted eerie thoughts — this contains the words emu, rat and deer.

Quizzes

These are always popular. The following was produced by adult birdwatchers for one of their campouts. At school such a quiz could be given out as an activity, to be solved by later research after the first score has been recorded in the game.

Questions

Banded Stilt — At what two lakes has this been actually seen nesting? Lake Grace and Lake Callabonna, in 1930.

Name 3 species of birds which lay only a single egg in the clutch? bustard, all petrels, little wattle bird in W.A., sooty tern, bridled tern, common noddy, lesser noddy, noisy scrub bird, gannet.

When and where was the night parrot first discovered? By Surveyor Robert Austin in 1854, about 12 km S.W. of Mt. Farmer in the Murchison.

What species lays the largest clutch? mallee fowl, 15-24, may be as few as 5 or as many as 33.

Who was the oldest native born Australian ornithologist to attain any degree of eminence? A. J. Campbell, b. 1853, first published in 1881; E. P. Ramsay, b. 1842, first published in 1965.

Sir John Cleland, until he died late August, was the oldest surviving member of the Royal Australian Ornithology Union, having joined in 1902. Who is *now* the oldest surviving member? A. H. Chisholm joined 1907, first started publishing in 1908.

The CSIRO Index of Australian Bird Names gives some odd vernaculars used in some parts of this country — what are the usual names of the following:

Tom Pudding — hoary-headed grebe
Chockalott — major mitchell
Shuffle-wing — black-faced cuckoo-shrike
Thunder-bird — golden (and rufous) whistler
Wheel-barrow bird — wedgebill
Gray Peter — singing honeyeater
Australian canary — white-plumed honeyeater
Pimp — zebra finch
Kelly — raven, crow.

What other birds than shearwaters have been called "mutton-birds"? red wattle-bird, white-winged chough, pied currawong.

What bird has a song which is often rendered as "Did-you-get Drunk? wedgebill.

Who wrote the poem "Where the Pelican Builds"? Mrs. Mary Hannay Foott (1885).

And does the pelican really build? What is its nest like? Slight hollows scraped in the ground and often without nesting material.

What is the oldest fossil bird found in Australia? — The oldest bird remains are feathers — 3 so far found in Lower Cretaceous beds in Victoria.

Mutton-birding is the commercial hunting of mutton-birds, or shearwaters. What is "Blackbirding"? — the kidnapping or recruiting of South Sea Islanders (Kanakas) for the Queensland sugar plantations in the last century.

Many birds in England have been made famous by poets. What is the Australian bird which has the most famous reputation due to poetry? — The bell-miner (Manorhina melanophrys) of the east, made famous by Henry Kendall's poem on bell-birds.

In the War Years the term "Drongo" was used to apply to a person who was well-meaning but ineffectual — This was not due to resemblance to the bird of that name but to something else? What? — A racehorse which invariably trailed the field. "And along came Drongo."

Some famous bird names are not names of birds, such as Bombay Duck which is a fish; in Australia a Blue Duck is used for something that never was, but there *is* a Blue duck not far from Australia. Where is it? — N.Z.

What was the first species of bird reported from Australia by European explorers? — Torres Strait pigeon (1606 — Luis de Torres).

The well known blue manna crab, an important commercial species.

PICTORIAL PAGES

Crustaceans not only provide some of our most delicious meals but are among the most important of the predator species found on beaches and in estuaries. Their size varies from the tiny creatures found in floating plankton to the biggest lobsters.

Soldier crab of muddy estuaries. (Photograph by Keith Gillett)

Freshwater crabs found in inland pools, especially in northern Australia.

These are a different group from the true crabs. Most are marine.

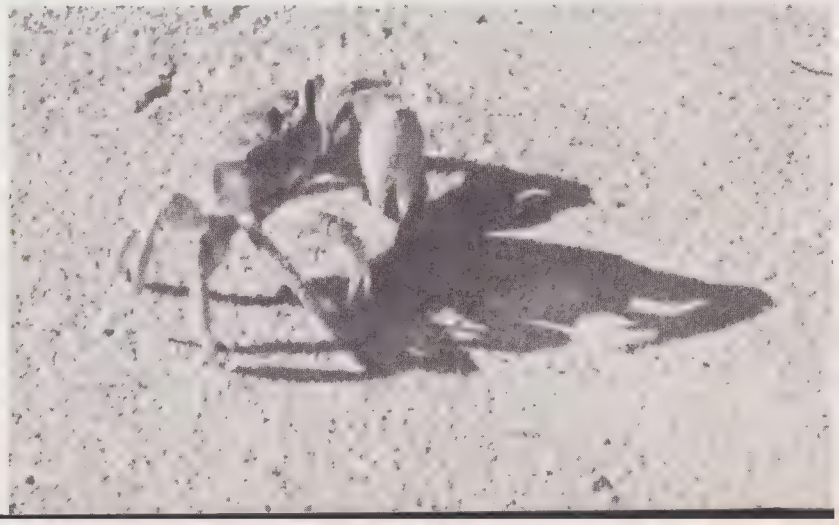
These two photographs by Keith Gillett are highly magnified and show some of the microscopic crustaceans which dominate the floating life of the sea. The single individual is a copepod.

A scientist examines one of the commercial species of prawn.

This primitive crustacean is similar to animals found as fossils in the Permian period about 250 million years ago. Unlike other shrimps the mountain shrimp has a flat, not humped, body.

Rock crabs feed on reefs at low tide.

Ghost crab of sandy beaches.

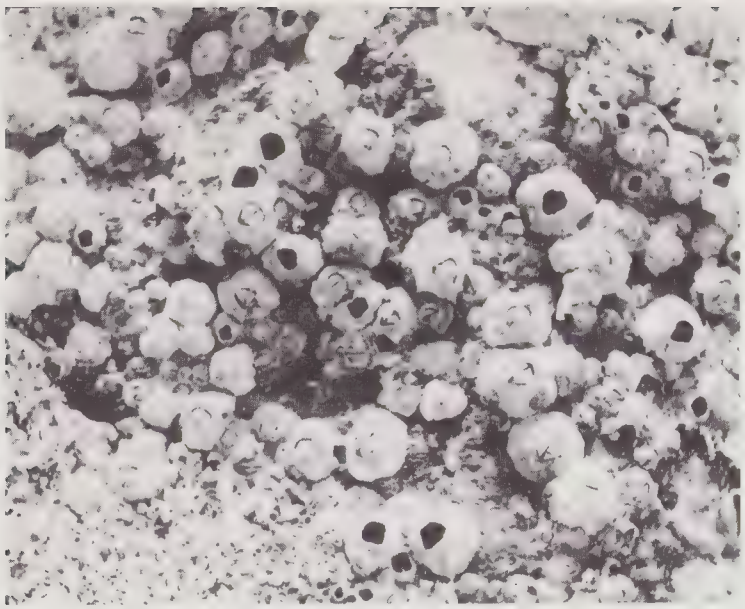


Freshwater crayfish such as the yabbie shown here are popular food items.

This larger clawed form is a burrowing species found in southwestern Australia and known as the koonac. Marine crayfish are a different group from the freshwater species since they have no large claws. The freshwater crayfish do form an important industry however and strict controls are placed on the sizes which can be caught.

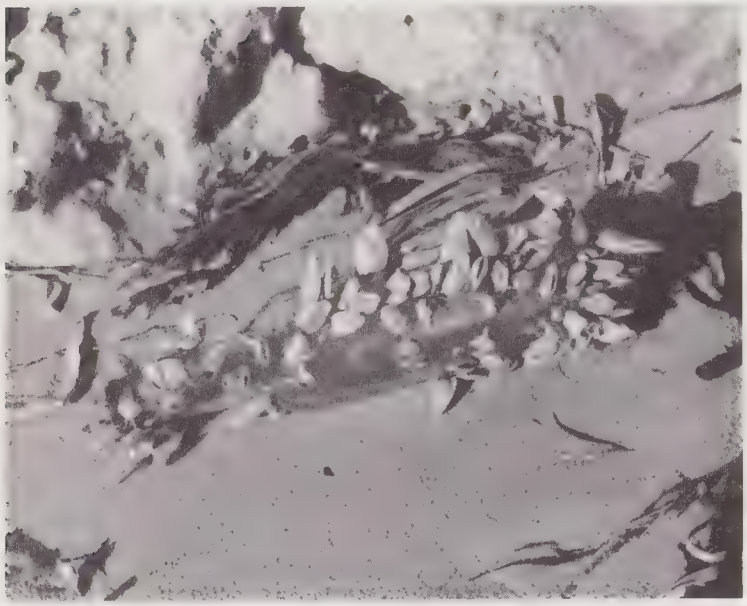
Flat lobster, Balmain bug, flapjack and shovel-nosed crayfish are names given to this crustacean, seen from beneath.

Here a fisherman measures one of his catch to make sure it is of commercial size.



Acorn barnacles on a reef rock.

Acorn barnacles on the underside of a whale.



Goose barnacles clinging to a floating bottle are washed ashore.

Barnacles may look like molluscan shellfish, but they too are crustaceans. Jointed limbs distinguish them, and class them with the arthropods, to which insects also belong.

A goose barnacle on a young loggerhead turtle.

MORE ABOUT THE MULGARA

by R. F. EWER. Photographs by the author.

In the first instalment of this article, published in September, 1969, I described some of the habits of the mulgara as seen in captive animals and tried to show how these relate to what we know of its way of life in its natural surroundings. Now it is time to turn to the growth and development of the youngsters.

To watch a young animal grow up and see how its behaviour, as well as its physical structure, matures and develops is one of the most fascinating occupations for a naturalist. One by one, all the adult habits put in their appearance and time and time again you are struck by how small a part learning seems to play in the process. True, skill and dexterity improve with experience but each species of animal does things in its own time, in its own way, even if hand reared, so that there is no question of copying mother. To take two apparently trivial examples: each species has its own particular way of cleaning itself and the youngsters "know" what is right for them without having to be told to wash behind the ears. As we have seen, a mulgara digs by scratching with its paws, either both together or in quick alteration — what it does *not* do is make a few scrapes with one paw and then a few with the other..... but that is exactly how African ground squirrels dig to make their burrows. The mulgara pushes out loose soil with its feet — but its cousin, the dunnart, never does this, although it uses its paws in just the same way as the mulgara.

It is only because we are taught most of our skills that we think it odd to suggest that other species can do so much without any training or instruction. Even we are born with certain "programmes" already present in our brains — we do not have to learn how to breathe nor how to suckle. If every mulgara grows black hair crests on its tail and no dunnart ever does — why should the mulgara's brain not also develop slightly different "programmes" from the dunnart's? To me watching these programmes come into action, as a young mammal matures, is a never-failing source of delight and wonder, and in this my mulgara family was no exception.

David Fleay's account in the December 1965 issue of Wildlife in Australia has already been mentioned. His pair bred in captivity but my young family were the offspring of a female caught carrying very small pouch young. This means that I cannot give precise ages, for I do not know how old the litter was when Bella, as I named their mother, was captured. I thought they might be about two weeks old, but this is no more than a guess.

Mulgaras do not have a true pouch but in the breeding season the skin around the teats grows to form a sort of raised rim where the hair is specially long. On either side the flap of skin forming the rim folds across and so covers and protects the young clinging to the nipples beneath. It is very easy to push these flaps aside and look at the young but marsupial mothers are often upset by such treatment and it may cause the loss of the litter. Because of this, neither Fleay nor I disturbed our animals and we were both rewarded for our forbearance by seeing the litters successfully reared.

As the young grow they presently start to protrude from the "pouch" and can be seen, pink and naked at first, just between the mother's hind legs. Soon they begin to inconvenience her and to keep them clear of the ground, she has to hold her rump high as she walks: finally the point is reached where she must leave them in the nest and come out to forage and feed unencumbered.

Fleay tells us that before she comes out, the mother makes her young release the nipples by shaking herself to and fro. I never saw this but I am sure it is true for when Bella first took to leaving her young in the nest, her appearance was always heralded by the most alarming threat hissings from the youngsters — which I took to be in protest at being thus shaken off.

The young will not come out of the nest for almost three more weeks, but there is always the danger that they may wander out by mistake, or be accidentally dragged out by attempting to cling to the mother as she leaves. If this happens, the youngster is not left helpless and lost; the mother has a way of bringing it home. Many placental mammals, including our cats and dogs, will retrieve a lost youngster by picking it up gently in their teeth and carrying it back to the nest. The mother mulgara has a different method. If she comes upon a strayed baby, she gives it a quick sniff, deftly turns it with her paws so that it lies lengthways, with its tail under her nose and its head below her chest and then pushes it back beneath her body where, in an instant, it is clinging to a nipple: thus attached, she carries it back to the nest. The mother's fur is so long and the whole thing happens so quickly that I never could see exactly

Baby Mulgara with straw for bedding.

how the baby attached itself but I suspect that, as happens in the south American mouse opossum, it rolls over on its back, clutches her fur in its paws and then works its way to the teat. The retrieval is not simply a matter of the mother bringing the lost baby home: the baby itself must respond in the right way when she pushes it under her body. Even with placentals, the baby has its own part to play: when picked up by the mother, it does not struggle but lies limp and quiet so that her job is made easy and, indeed, a baby squirrel helps actively by coiling around its mother's shoulders so that she is in no danger of tripping over it.

When the baby mulgaras are a little older and have started to explore the outside world, they may still sometimes need help in getting home. Now their method of transport is different and they themselves take the initiative. They do not wait for the mother to come to them but if they see her nearby, they run to her and, jumping on her shoulders or flanks, cling to her and let her carry them home. The mother's role has changed from pick-up van to bus.

Fleay was not exactly sure when his female gave birth to her litter but he estimated that the young were 73 days old when their eyes opened. Bella's litter opened theirs just 8 weeks after she was given to me, which should mean that mine were probably after 17 days old at the time, if Fleay's estimate is correct. But here there is a discrepancy. As soon as their eyes were open, Bella's youngsters at once started to make their first tentative explorations of the world outside the nest: Fleay's did not come out for another fortnight. So — did I make a mistake about the opening of the eyes; were Fleay's youngsters really slipping in and out unbeknownst to him — or can two litters behave so differently? Only when more litters have been studied will be we able to sort out this puzzle. To make all this clearer, I have made a table, showing when I first noticed the various things that Bella's youngsters did. This will be found at the end of this article.

The first journeys out of the nest were very brief — sometimes a youngster would merely come out, turn round and go home again and sometimes one would just put its head out and draw back again — but in the next few days they became bolder and had soon explored the whole of their cage. At this stage, they are quite unlike their parents: they are furred and the black tail tip is there but over the whole of the body the hair of the "puppy coat" is a dark gun-metal grey. In a few days, however, the longer, orange-sandy hairs of the adult coat begin to appear — first on the head, then gradually spreading back over the shoulders and body. By the time it has reached the middle of the body, the orange colour starts to appear on the base of the tail too and spreads forwards, so that the rump is the last part to assume the adult colouring.

At first the young are rather unsteady on their feet, but gradually their co-ordination improves. By the time their eyes have been open for a fortnight, they are able to run, they can sit up on their hind feet and can send the sand flying out between their hind legs as they scratch with their paws but they are still completely dependent on their mother's milk and cannot yet take solid food. They are now about to enter a period of rapid change, when some new action is to be observed almost every day. This is the stage when they start to eat on their own and also the time when they begin to play. Both processes are fascinating to watch. You may be feeding the mother on chopped up meat or dead mouse and these she eats readily. The young will smell the meat and see her eating but they do not recognise the smell as signifying "food" nor do they show any signs of trying to copy mother. At first they do not even seem to see a moving insect — at any rate they pay no attention to it. Just at the beginning of the third week, however, there is a change. They now notice a moving insect, look at it and may even follow after it — but they do not yet try to bite it. The next stage is to make a half-hearted tentative bite, but it is not until the middle of the third week that they actually grab the insect in their mouths and eat it. And now comes an interesting point. Although they will seize a live insect and devour it greedily, they still will not take food that does not move — this comes a little later. It seems that their brains do not at first tell them what is good to eat in terms of smell, but in terms of movement. What they "know" at this stage is very

Mulgara on hind feet.

simple:— "if it is small and moves, you bite it" and only a little later can smell alone tell them to eat.

This means that if you want to get the best results, you should make sure that at this stage you provide the youngsters with live insects, small and soft enough for them to eat. In this way they will start to supplement their diet with solid food at the earliest possible moment; they will benefit, the strain on the mother will be reduced and the whole family will thrive. I found mealworms were readily taken: At first I used to drop them in front of the youngsters but very soon this ceased to be necessary and they would help themselves from a small dish.

Mulgaras have two main sorts of play — running or "escape play" and fighting play. In fighting play two youngsters will rear up, clutching at each other with their paws and biting at each other, generally ending by falling over and rolling together on the ground. As with kittens and puppies, the biting is not real biting and no harm is done — but "mistakes" do occur and sometimes what began as play switches over into a genuine squabble, accompanied by threat noises. It seems to me that my little mulgaras were rather more prone to this sort of error than either puppies or kittens. Maybe this was one reason why, as they grew older and more agile, escape play became their favourite diversion. In this game the youngster races to and fro at high speed, with frequent zig-zag changes of direction and will dash in and out of the shelter of any sort of convenient hiding place. I gave mine a few short lengths of drain pipe in their large enclosure and these were ideal for this sort of play. The youngsters would vanish into the pipe and then either suddenly pop out the far end or turn and reappear where they went in. Escape play was contagious: if one youngster started, the others would usually join in — but all the same one could not really say that they were truly playing together. They did not chase each other and the movements of one bore no clear relation to those of his fellows. This is in contrast to kittens, where running play is definitely chasing play and the young are not just all playing at the same time, but playing *with* each other. Kittens will also play with inanimate objects such as a piece of screwed up paper or a ping-pong ball. My mulgaras would not do this: given a ping pong ball, they would sniff it, maybe attempt to grasp it with their paws or shove it along with their noses for a few moments, but they lost interest very soon and the the toy was simply abandoned.

In the mulgaras, besides eating and playing, there is yet another piece of behaviour that appears in the third week after the eyes have opened. We have seen how the youngsters at first paid no attention to a mealworm: they were equally without interest in bits of grass or paper. Then, in the same way as the mealworms come to have significance in their lives, so too do things that are suitable for lining the nest. Towards the end of the third week, the youngsters start to carry in bedding; they pick up bits of grass, pieces of frayed bark or even strips of paper and carry them home to the nest. I once saw a comic incident. I had put some strips of paper into the enclosure, to be used as bedding. A youngster saw and followed a crawling mealworm and tried to snap it up as it went under one of the paper strips: he missed the mealworm and got the piece of paper instead. He stood for a moment, apparently puzzled and then, finding himself with bedding in his mouth, he did the proper thing — he turned around and trotted back with it to the nest box — although it was quite clear that he had not originally had any such intention.

I think it is probably not without significance that the short space of 36 hours saw the first attempt at eating, the first fighting play and the first carrying in of bedding. All three involve co-ordinated use of the jaws and they probably appear at roughly the same time because this is when the part of the brain concerned with the control of biting reaches a sufficiently mature stage of development.

By the end of the third week, the young are virtually independent. They can catch and eat insects for themselves. They can now use their hind legs to push out accumulated soil as they dig. They can make a warm bed for themselves and every day are becoming stronger and more active. If some disaster overtook their mother, they would now stand a chance of surviving but my family still showed no signs of breaking up when I finally had to leave them at the age of five months. Since mulgaras breed only once a year, it is quite likely that they remain together amicably until the next breeding season. Whether the yearlings then just tend to wander off of their own accord or whether the mother starts to drive them away, as a cat does her kittens when her next litter is due, is something that only the future will show.

Observation	*days after mother caught*	*days after eyes open*	*age estimated by Fleay*
Babes easily seen, pink and naked as mother walks about	28	—	—
Babes first left in nest	36	—	58
Eyes open	56	0	73
First exploring outside nest	56	0	87
Sandy adult hair on head and shoulders	58	2	
First attempt to dig with fore paws	66	10	
First notice mealworms	69	13	
Dig effectively with forepaws			
Can sit up on hind feet	70	14	
First signs of running play	71	15	
Mealworms first eaten	74	18	
Bedding carried in: first fighting play	75	19	
Use hind feet to push out sand while digging	78	22	

Mulgara — *Dasycercus cristicauda*

IN OUR RED CLIFFS GARDEN

by L. G. CHANDLER

Photos by Author

In June when the pink blossoms of prunus are at their best, the yellowing leaves of old karabil, the white cedar, at the corner of the garden, are falling to the lawn. By July, only the limbs, twigs and yellow berries of the cedar are outlined against the blue of the sky. The garden is walled in by trees; mahogany and sugar gums for their shade and beauty, and flowering gums, cedars, jacarandas and flame-tree for the beauty of foliage and blossom. Lesser trees and shrubs such as prunus, almond, cotoneaster, broom, Geraldton-wax, wisteria, tecoma, etc., fill in the flower-beds and lawns.

There have been many changes in the garden. Most of the larger trees were established early, and with their growth and during our absence from home on holidays in hot weather, the less sturdy plants suffered from lack of water. Roses, particularly, were the most vulnerable; and after years of our fighting to save them, most of the roses gave up the struggle and died. Now we have decided to concentrate on a few roses and grow drought-resistant shrubs like the wax-plant, and annuals that can be brought to perfection before the scorching, summer days.

Karabil the white cedar in winter.

Stump-tailed lizard.

In the rich soil almost any plant will thrive, provided it has the life-giving water; and the big trees have their roots embedded deeply in the moist sub-soil. Karabil, the white cedar, grows into a magnificent tree in this district. With its mauve blossoms, yellow berries and young green growth it is the pride of the garden in the late spring; but when the jacarandas and the flame-tree mingle their colors against the blue sky with drifting, white clouds for a background, the memory of the earlier maturing cedar fades in the presence of this fresh glory. The jacaranda bells float silently to the grass below, turning a neat somersault as the heavy end twists in the air, and soon there is a carpet of red, mauve and green where the fallen blossoms of flame-tree and jacaranda mingle on the lawn.

One of our favourites among the smaller shrubs is the Geraldton wax-plant. Its pretty pink blossoms are on show for months, and gradually, I intend to cover the graveyard of the roses with wax-plants. It is amazing the amount of dryness that this shrub can stand, and by careful watering one can build up the drought-resistant qualities of a plant of this description. In a district where water is scarce, such a plant is valuable and its lovely flowers make it an attractive addition to any garden.

I have a liking for winding paths and flower-beds with curves, and, as much as possible, I planned them in the layout of the garden. It is on one of these curves that the wax-plants flourish, together with ericas, brooms and berry trees. This is a corner that the wrens like, and often from here black-backed and purple-backed wrens visit a window in the shade of a wisteria vine to fight a supposed rival. When passing through the flowering wisteria, they look like blossoms themselves and long after the plant's flowers have gone, the wrens enrich the vine with their colors.

Although the garden is not big I have a list of over fifty species of birds that I have seen there, and several of them build nests in the trees. One interesting visitor that comes annually from the south, is the grey fantail. It spends the winter with us and its violin-like notes remind me of happy days in southern forests. About October it suddenly disappears, a few remain to nest, and I miss its quaint song and twisting flight after flying insects. Its cousin, the willy wagtail, is always with us and rears several broods a year. This species has a difficulty to survive from the sparrows, which for some

strange reason delight in destroying the nests and young of other birds. Willy is aggressive enough, and will fight anything in defence of home and young, but often has to build several nests before safely rearing a family.

One season a willy gave my little girl, then about five years old, a lot of amusement. On this occasion the birds had nested in the flame-tree, and for the first time they resented my presence near the nest. As I walked across the lawn, willy, emitting scolding notes, would settle on the bald spot on my head and peck vigorously. Mary on the verandah would double up with laughter and gurgle: "Walk across again Daddy, walk across again!"

In the early days of the garden where old karabil now stands on guard, I had a wattle-tree growing, and one afternoon I was entertained by a boobook owl and the reactions that its presence caused to other birds. All through the afternoon different species of birds discovered the owl resting in the thick foliage of the wattle-tree, and each in turn made known the presence of the enemy. Most consistent was a spiny-cheeked honeyeater that took upon itself the duty of closely watching the owl, and in the hush of evening when all the other visitors had retired to their roosting-trees, I could still hear the "choc" of the honeyeater.

Just as the sun was setting a big flock of yellow-throated miners passed through the trees in the garden, and the noise, when they discovered the owl, was sufficient to warn all the birds within a quarter of a mile that danger lurked.

A laughable incident occurred when a pair of chestnut-tailed thornbills arrived in the wattle-tree in their search for insects. One bird was ahead of its mate and was chirping merrily when it suddenly saw the night bird. For a second it was petrified with fear, the notes trembled to a quick finish in its throat, and then it practically turned a somersault in its efforts to escape. When it recovered I wished I could translate the torrent of abuse it poured upon that luckless owl. The owl only opened sleepy eyes and ejected another pellet composed of mice fur and the wing cases of beetles from its mouth.

For years a pair of house swallows nested under the verandah, but like the wagtails they were continuously persecuted by the sparrows; and, after a year or two they gave up the unequal struggle. The magpies have not nested in the trees for several years, but still visit the garden and bring their young. They are the terror of the sparrows, and tear the young from the nests to feed their own young.

Goshawks, too, occasionally drift in and snap up unwary sparrows or other birds. One day I was listening to the lovely notes of a grey thrush that was hopping about on the lawn when a goshawk dived over the roof of the house and carried the thrush away. Sad to relate the thrushes that arrive rarely survive, for stray cats find them easy victims. Rufous whistlers too, that fill the garden with rich melody, find it hard to evade the cats.

Two gaily coloured visitors are the male red-capped robin and the male mistletoe bird. The robins nest in the vines, but the mistletoe birds only visit the pepper-trees to feast on the hot, red berries.

The wireless pole has an attraction for a number of birds that are passing through. Sometimes a kookaburra sits there and laughs, but the magpies soon discover its presence and it departs towards the river in terror of its life; and as the magpies attack, the feathers fly. In late spring a red-backed kingfisher often rests there and utters its loud whistle, or a black-throated butcher-bird warbles its flute-like song. Always the magpies use it as a vantage point to watch for stray hawks or other birds to chase.

Honeyeaters are present all the year, and when the flowering trees are in blossom they gather the nectar from the flowers and enliven the garden with song. The spiny-cheeked honeyeaters take possession of the jacarandas and are forever bullying the smaller fry. They have beautiful notes and their songs are a feature of autumn days when most birds are silent.

Useful birds in the garden are the silvereyes and thornbills. They all take their share of cleaning up the aphis on the rose bushes. I like to hear the tinkling notes of the yellow-tailed thornbill. This is the first native bird to build its nest in the trees and one usually finds the opening to the dome-shaped nest facing the east. The presence of an open nest on the top of this thornbill's home has always been a puzzle to naturalists. Some think the male bird may use it at night, but I have frequently examined this open nest at night by the light of a torch, and it has never had an occupant.

The little thornbill can be heard calling from the treetops at any time of the year, and appears to be very local in its range, but I rarely see the chestnut-tailed thornbill now. The whiteface is another bird that has disappeared. With other species that disliked the new order that was introduced with the clearing of timber and the planting of vineyards, they have moved out to the peace of the mallee scrubs.

I am sitting on the verandah as I write this. It is nearing the finish of a perfect Mallee day, and the setting sun is bathing the garden in a golden glow that is a feature of the inland. Karabil, bare of leaves but with its host of berries shining in the rays of the sun, fills one with a joy that contemplation of beauty always brings. The glossy, green leaves of the flame-tree are in strange contrast to the fading yellow leaves of the jacaranda, and in the rich light the pink blossoms of an almond tree have their loveliness enhanced.

Not a leaf is stirring, but to add animation to the scene a black-backed wren, its vivid colours gleaming, comes hopping across the lawn.

Southern scrub robin.

Bar-shouldered dove.

DOVES AND ROCK WALLABIES

by J. BARRY LAVER

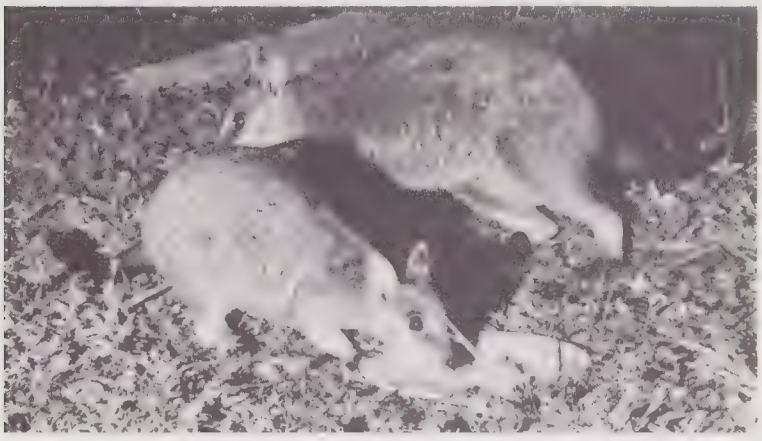
Not long after coming to the Cape Cleveland lighthouse we noticed a pair of bar-shouldered doves feeding on our lawn. Their apparent gentleness and faithfulness impressed us and we watched them daily. We became concerned for them, with two large cats next door with a reputation as hunters. In fact on one occasion I surprised one of these cats about to spring on one of our doves. The cats brought home most of their catches and we do not know of any bar-shouldered doves amongst them.

On another occasion the other lightkeeper found a sick dove and kept it over night. Next day it seemed better so he released it after tying a piece of cloth around one leg. We watched hopefully for that little piece of cloth, but never saw it. Perhaps it came off. We liked to think so. For a time the doves did not come to our lawn, although we saw an occasional one at our birdbath, or in the bush about. Then one day there were three doves on the lawn. Thereafter, for a few weeks there were two or three birds. We suspected that one was the fledgling, but could not decide which one it might be.

We thought it would be a good idea to try to feed them, so we put out little heaps of wheat around their favourite feeding spots. We had two old pensioner hens at the time who were partial to wheat, and we tried to keep a sharp lookout for them eating it. Of course they knew all about it and every morning their first call was under the doves' tree. However we were pretty sure the doves were not eating it; we would watch them picking all around the heaps and never touch a grain.

Then one morning early — before the hens appeared — the wheat was gone. Could the hens have made a last minute call the night before? We decided to check. Next evening after the hens roosted I put some wheat in the usual place. I beat the hens up next morning — and the wheat was gone! We were obviously getting a night visitor. We suspected the little rock wallabies which we knew to be about, and so we would watch from the windows on moonlit nights. We put out the grain each night and more and more often it was gone in the morning.

Rock wallabies (Petrogale penicillata) feeding.



Then one night we saw our first wallaby come. We were excited, and soon we were to see them frequently, feeding on the wheat I now put on a plate. Some nights it would rain or strong winds would make a great noise in the bushes and the wallabies would not come. They gradually became more tame, and I would sometimes disturb them on the lawn when I took their supper out. Eventually, and quite suddenly, they seemed to accept me, and now they come every night, rain or gale.

There are at least five of them, three with black tails and two with white tips to their tails. They are often on the lawn now when I go out and barely keep ahead of me as I go around the house to their plates. They generally hop into the edge of the bush, about 15 feet away, and in the torchlight I can see their eyes watching me. Sometimes I see a smaller pair of eyes below the larger — a new generation of wheat eaters coming along! One joey has been weaned since we have been watching and now comes by himself. A fair amount of fighting takes place over the grain and so I now spread it over 2 plates. This helps, but we are still woken up sometimes at night by the hissing and thumping of brawling wallabies under our bedroom window.

I had photographed them several times from a bedroom window, but as they are quite small this necessitated considerable enlarging and cropping of the negative to get a good picture, so I decided to go outside. I sat under the house one night behind a piece of hessian and photographed them from 8 feet. The first couple of flashes startled them and they hopped off a little way, but they came back immediately and I was even able to photograph them fighting by the plate.

Our whole family can stand at the open window now and talk freely with the wallabies feeding 6 to 8 feet away below, quite unconcerned.

They only really like wheat. We tried to feed them laying pellets and these were sometimes taken. but generally were rejected. (Perhaps they are wiser than I, for I have been told since that these pellets are very rich and could be harmful). Molasses was likewise not popular. One night I added a few peanuts; in the morning all the peanuts but one were on the plate, and beside the plate was half a peanut. It was evidently tried and found wanting.

We have seen rock wallabies at dusk on other parts of the Cape and they have fled away down the grassy, rocky slopes. On one occasion I called one with the same call I use each night as I feed them, and he stopped in his tracks and turned towards me. We watched him for a minute or two before he hopped off. I felt very close to communication with him. I like to think he had recognised my call.

I am sure that very little effort I could tame our rock wallabies further and perhaps have them eating out of our hands, but fear of who may replace me here someday and what his attitude may be prevents me from trying.

Some of our most beautiful and interesting wildflowers and birds, especially honeyeaters, occur in the wallum heathlands now under threat of further development. In our March issue we will be publishing an article on Wallum ecosystems by Dr. A. G. Harrold; with John Sinclair he has been a prime mover in the attempt to conserve some of these remarkable areas including Cooloola and Fraser Island.

Brown Honeyeater (Gliciphila indistincta) feeds young in wallum banksia. (E. C. Smith)

THE WONDERFUL WALLUM

by John Sinclair

Until the second half of the twentieth century, when gambling in land development projects became a frenzied obsession, the coastal lowlands of South-east Queensland lay like a sleeping serpent separating the main coastal cities of Nambour, Gympie, Maryborough, Bundaberg and Rockhampton from the actual coastline.

The aborigines gave the name "Wallum", to the delightful banksias which produced such an abundance of honey that the natives would feast on them. The banksias the Aborigines called Wallum were the tall, saw-tooth leaved, flowering species of Banksia aemula and Banksia serrata.

Few Europeans have savoured the delight of Wallum honey, instead we have applied the name Wallum contemptuously to the infertile coastal lowlands where these particular Wallum banksias thrive.

The special characteristics which made the wallum suitable for banksias likewise made it very suitable for a wide variety of popular wildflowers, and an abundance of native fauna which took full advantage of the honey-rich flora and mild climate to build up quite dense populations.

A road cuts through wallum heathland. (E. C. Smith)

White-cheeked Honeyeater (Meliornus niger). (E. C. Smith)

Wallum Boronia (Boronia falcifolia), confined to coastal wallum areas.

"Wallum" was quite loosely applied in the coastal lowlands region to any land that had little productive capacity for agricultural, pastoral or silvicultural purposes. Wallum was a term of contempt for what the poineer landholders regarded as wastelands. Because of this, the wallum lay largely dormant and untouched until the post-war avariciousness for more land triggered a new assault to create new ways of using and developing these areas. This coincidentally meant destroying those wonderful attributes of this very attractive area.

Fortunately, the wallum was both stubborn at surrendering easily to the assaults of man and very expensive to conquer. The wallum quickly suckers and returns with incredible speed to its original vegetation types if not controlled further. The cost of fertilizer was prohibitive.

But persistent man found ways and means. By using massive mechanical means combined with the use of chemical hormones to control suckers it was possible to control the wallum for either forestry plantations or for pastoral development. By the use of an exquisite number of taxation concessions for primary producers, by using inflated beef prices during a land boom and by taking advantage of the superphosphate bounty to the tune of $1,500 per annum for the average wallum land developer, it became economically feasible for rich "Queen Street — Pitt Street" farmers to make the assaults on the wallum at the taxpayers' expense.

So during the last quarter century the wallum — that vast reservoir of untouched natural land between Brisbane and Rockhampton — has been under increasing attack. Much of the Wallum which had been already alienated at give-away prices has been cleared to take advantage of the developmental taxation concessions. Large slabs of land were offered in land ballots. Now others envious of the early pioneers who got their land as "gifts" are pressing the Queensland Government to release the remaining 40,000 hectares of Vacant Crown Land (V.C.L.) for development purposes.

Conservationists have watched the rapid destruction with dismay. We have seen a land grab going on which would put the "Wild West" land deals to shame in the extent of the high level political lobbying which has been carried out.

Conservationists want part of the wallum for "Wallum National Parks", but only a part of it. We believe that the remainder of the so far uncommitted "Wallum" should remain as a land bank.

A LAND BANK

One of the greatest problems besetting conservationists now is the rapid alienation of land — the conversion of vacant crown land to leasehold, the subsequent conversion from leasehold to freehold, and the rapid subdivision of freehold. In the process the whole principle of land use planning is entirely at stake.

Few people would willingly ever want to find themselves without any financial liquidity at all. Everybody wants some ready cash to take advantage of any outstanding offers which come along. That is why a bank of uncommitted vacant crown land is one of the most valuable resources a State can hold.

In this region there is a bank of 200,000 acres of Vacant Crown Land on the Wallum, but the protagonists for development are arguing the immediate determination of this land use, and to this end a land use study is currently in operation.

Admittedly, to placate the conservationists we expect to be offered some national park areas as a matter of course, but we must not be lulled into complacency over such an offer because the whole business of making a decision over Wallum land use now is hasty, premature and in violation of one of the basic tenets of good land use planning, that is, keeping all options open with a pool of uncommitteed Vacant Crown Land. This is the land bank which the wallum can best serve.

FUTURE WALLUM USES

In 1970 an assessment of several economic studies of the wallum concluded that it was against the public interest to use the wallum for pasture development. The only economic development proposition at that stage was for a long term (minimum 40 year rotation) softwood forestry plantation. Although other land uses might be profitable for individual land holders, all would be subsidised by taxpayers through taxation concessions, superphosphate and other bounties, freight concessions and other lurks.

Despite the land and beef boom of the early 1970's the wallum developers did not realise their optimistic profit predictions. Indeed one wallum pastoralist is quoted as commenting on the low productivitiy of his block: "The only thing which this land will grow is (subdivision) survey pegs". Until 1973 practically all land clearing for subdivision in the wallum zone was done under taxation concessions allowed for primary producers.

With the 1974 beef slump the land-holders who had sought to take full advantage of taxation concessions found themselves in dire straits. They now claim they can only survive with further massive taxpayer aid.

Conservationists argue that the land-holders of wallum blocks who find them unprofitable should sell their blocks to the Crown. Such blocks lie close enough to existing pine plantations to be incorporated in the forest complex already developed on the wallum, which according to a Queensland Government publication is now the largest man-made plantation in the world.

With the surrender of these pastoral blocks the forestry could declare a ten year moratorium on clearing any more of the native hardwood forests on the wallum whilst the future of the valuable remaining native forests is reappraised.

The Forestry Department has been slow in showing initiative, and would seem to prefer destroying native forests rather than to plant up derelict farmlands. At any rate the land abuses are seeing the areas of natural wallum reduced by tens of thousands of acres each year — a rate which must be drastically slowed down as a matter of urgency both in the interests of the national economy and in the interests of conserving a vital and beautiful part of our wonderful wallum.

The editor, second from left, looks at a pilot whale at Marineland, Florida, U.S.A.

ALONG THE NATURE TRAIL

with the Editor, VINCENT SERVENTY

North Queensland, Vanishing Wilderness

There is nowhere in Australia richer in fauna, rainforests, important Aboriginal art, and rare plant and animal species than North Queensland. And it has the Barrier Reef as well.

Elsewhere is this issue is an advertisement for a two-week program in the Cairns area next July, to be held by the Wildlife Preservation Society of Queensland. Part of the finance for this program comes from money donated to the Society's 'Busst Fund' Appeal. The Fund has been set up as a memorial to John Busst, a great worker in the cause of the Great Barrier Reef and of northern rainforests, and in honour of his sister Phyllis whose generosity made the Fund possible.

The pressures of development in the north of Queensland have already caused the loss of many important areas of rainforest, and in spite of the new legislation to establish a marine national park the Great Barrier Reef is still not properly protected. So this program will help draw attention to many of the North's needs, and the Busst Fund, which is ongoing, will be applied to other matters connected with Reef and rainforest. Intending donors should address the Secretary, Wildlife Preservation Society of Queensland, Box 2030, G.P.O., Brisbane 4001.

Bird list for Cape York

Mary Ellen Talmage of Brighton, Victoria sent me the following letter.

'*Rex Ellis asked me to keep a record of all birds spotted on the Safari to Cape York and to forward a copy to you when it was complete. It must be borne in mind that though I am very interested in bird study it is purely on an amateur level.*'

This is a very valuable piece of work. Lists from rarely visited places are of use to other ornithologists. Should any of our readers want to refer to this list it is available on loan. One group of photographers have already studied it with some interest.

Re-cycling

Mrs. Patricia Olbrich of Mount Kembla, N.S.W. sent in a cutting describing how an American magazine, by being printed on recycled paper, saved fourteen acres of forest from being cut down for each issue. She went on to say she has a wildlife 'infirmary' where sick baby kangaroos are brought to her. I am hoping to be able to say more about this question of wildlife hospitals and hopefully there may come a day when there is a web of these spread across Australia with skilled assistance from veterinarians to help in the work.

Mimicry

Lesley Styles of the Jabiru Art Gallery in Wittenoom, W.A. writes:

'*Being an artist who paints landscapes of the complicated Pilbara, particularly the gorges, I am for some days in the one spot at the same time each day. The birds, which are naturally fearless in any case, are curious and do everything but walk over my palette. I've been within feet of a bowerbird's bower and been highly entertained but never have I heard such a repertoire as that of a butcher-bird which frequents a canyon where I paint frequently. This fellow favours a big dead tree and I've heard him rattle off a perfect reproduction, one straight after another of a pee-wit, magpie, bush canary, bowerbird, blue-winged kookaburra, crow, spinifex pigeon, Port Lincoln parrot and a honeyeater I can't quite place. I've heard him many times and once while he was doing his pee-wit turn he was attacked by an outraged flock of the same.*'

The bush canary would be the white-plumed honeyeater. Alec Chisholm in his *Bird Wonders of Australia* writes of the 52 bird species which are known to mimic, and says

"Birds of the trees are (with the exception of the bowerbirds) on the whole less consistent mimics. The most accomplished of them are perhaps the fruit-eating Olive-backed Oriole and the insectivorous Pied Butcherbird....."

Merrylands Conservation Club

Phillip White of Merrylands, N.S.W. sent in some details about this club and its President and founder Mr Brian Parker. At present the members are mainly young people from 8 years to 17 years of age, but they would like more members, particularly adults who could assist with leadership duties. The address is care of P.O. Box 7, Merrylands, 2160.

A poem to trees

Miss Sylvia McNall of Mount Glorious sent in a copy of a poem to trees in Portuguese forests.

It begins

'*Ye, who pass by and would raise your hand against me*
Hark en 'ere you harm me.
I am the heat of your hearth on the cold winter nights,
The friendly shade screening you from summer sun...'

Sylvia McNall writes

'This poem pleads for those trees that still grow and all land developers should have it clearly before them.'

Dollar-birds

Florence Dwight of Cheltenham, N.S.W. writes about a dollar-bird. This is her account.

Monday 18th February, Sydney, began as a beautiful summer's morning, but by midday a rising temperature had made it very hot and uncomfortable. In the early afternoon the sky began to darken with rain clouds and shortly after 3 p.m. we had one of our typical summer sudden downpours. I was surprised to see, beating up from the gully, a bird I thought to be a magpie. Driving against the heavy rain it alighted on the tip of a dead branch of one of the tallest trees, and extended its wings to almost full span. There it perched in a torrential downpour with lightning flashing and thunder crashing. Periodically, as the weight of water became too great, the wings were folded, shaken vigorously and then extended again. This was kept up for about ten minutes. Then, looking very soaked, but no doubt deliciously cooled the bird continued to sit in the heavy rain, buffeted by strong winds on its swaying perch. At this stage a check with the glasses showed it to be a dollar-bird. The storm was over in about 20 minutes. The bird remained on its perch for another 10 to 15 minutes, contentedly preening its drying feathers. Then as the sky darkened once more and a steadier rain began to fall the dollar-bird flew down into the gully and disappeared.

Game birds

R. Thornton of Stockton, N.S.W. puts in a plea for those unfortunate kittens dumped in the bush by 'kind-hearted' people who cannot bear to kill them, so leave them to starve to death.

He also points out that hunters are not the exterminators of 'endangered species' but only kill the more common animals such as rabbits and pigs, both of which are pests, as well as various game species such as ducks. The shooting of these is strictly controlled.

Certainly the major danger to our wildlife is destruction of habitat and most of our conservation efforts should be devoted to this problem.

Bearded dragon

Jim Russell of Patho, Victoria writes

'*I notice that you mention having received a letter from W. L. Lindgren of Hawthorne, Brisbane, asking how many bearded dragons will hatch at the one time. Within the next few months I hope to have the answer. Having seen a bearded dragon nesting I investigated and found it contained 33 eggs. Sixteen eventually hatched and no doubt several more would have done so had I not interfered with the nest. The incubation took four months from the beginning of November.*'

Mr. Lindgren is writing a report and this will be published shortly. We look forward to getting a copy. While on the subject of reptiles, the following is of interest —

Bobtail

Andrew Hay of Salter's Point, W.A. writes about his pet bobtail lizard. I should add that in the eastern States these skink lizards are commonly known as shinglebacks or sleepy lizards.

'*I came back from a two week holiday and found that one of my bobtails, Gertrude, was looking very pale indeed. I didn't know what to do so carried on feeding her and George. I found in the next week or so she gradually changed back to brown. Two days later I watched her changing her skin. First the skin came off her head, then the back, legs and tail. It took about thirty minutes and came off almost in one piece. A few weeks later George began to look pale and he too changed his skin but it took him four days.*'

Floods, storms and devastation

L. Taylor of Deagon, Qld., wrote the following letter shortly after the Brisbane floods.

'*I expect that in view of the recent massive floods you will speak about over-exploited environments. ...The persistent illusion that it can't happen here is one that is unlearned only slowly and painfully.*'

To those floods can now be added the Darwin disaster as well as various bushfire tragedies. It is cheaper to plan beforehand, than learn expensively later. It is the responsibility of governments to ensure that we have correct building codes and proper zoning so that flood and bushfire prone areas are not used for housing.

Diamond python

L. Naylor of French's Forest, N.S.W. sent me some notes he made on this snake in his area.

'I have accumulated these notes through my own observations in the bushland and in captivity, although I have not discovered any habits that have not been observed before by the professional collectors. My observations have been made over 12 specimens, all of which were later released, except for a 2.5 metre specimen which is still retained in my collection two years after its capture.

The majority of specimens I collected exhibited a coloration of black to steel blue base colours, sparsely covered by yellow spots over the body. Only two specimens exhibited more yellow colouring on their bodies than black.

Many areas once well known for diamond snake populations have suddenly become barren of reptile life, I believe reptiles are the animals mainly affected by the encroachment of civilization. Very few reptiles co-exist with man's development. Diamond snakes frequent valleys through which small watercourses flow. This I believe serves a double purpose: the watercourses attract mammals and birds which are food for the snakes, also they are very fond of bathing. I have observed specimens in the wild soaking for anything up to two hours. In captivity specimens will soak for days.

This python displays a somewhat maternal habit (in common with most other Australian pythons.) Upon laying its clutch of eggs it will curl around them. It is a debated question if this habit serves to protect the eggs from marauding predators or to incubate the eggs. They can raise their body temperature during this period, and the ability to do so would be an assisting agent to incubate the eggs.

I often have the unfortunate pleasure of receiving dead and maimed animals, and the people who kill the animals, particularly the reptiles feel no remorse. They slaughter through ignorance, and their fears I believe are derived from fallacies. Setting aside large areas of bushland in the very near future would be the only way to restore my faith in the term, so-called 'progress'.

(The disappearance of reptiles near 'civilization' is not only due to ignorant killing and loss of habitat but to capture for smuggling overseas, a practice which has been given some publicity lately.)

Bunny Moth

John Orrell of Smithfield wrote:

Saw a pic of the "Bunny Moth" in one of the books you sent, and it occurred to me that perhaps its full story hadn't been told.

I was down in S.A. in '48 and got the story then.

I've tried to contact Lindsay, but he's left Renmark and I haven't been able to trace him. This is John's story.

Twenty-five years ago a South Australian school teacher, Lindsay Humphries, found a curious moth sitting on a post in the Renmark school yard. It had a ponderous body, but frail wings. He couldn't identify it, but it was familiar to the schoolchildren.

"That's the Bunny-moth", they told him. "It's quite tame, and it won't fly. And it looks just like a rabbit."

A keen naturalist, Lindsay tried to have it identified, but no museum, university, nor even the State entomologist could give it a name.

Some time later, a boy brought a bright pink caterpillar to the school. Lindsay could half-identify it. It was one of the Cossid family, but to what genus and species he didn't know. The specimen was placed in an observation cage, and the next day it pupated. A few weeks later the adult emerged, and to Lindsay's delight it was a "Bunny Moth". So the first furrow had been opened in a new field of investigation.

The lad who brought the caterpillar said that he knew where there were others, so a small party of the school's naturalists went out to search. Lindsay wasn't at all surprised when his guide took him to some wasteland, dotted here and there with hardy samphire bushes. Cossids are wood-eaters — so much he *did* know. It was almost sterile country. Irrigation drains spilled their salt effluent on the flat land, and the hardy samphire was the only bush growing there. After a patient search they found the caterpillars, and Lindsay told me "We found one caterpillar for every twenty blisters. We were using ex-army trenching tools and the ground was rock-hard."

They collected numerous caterpillars, but Lindsay was intrigued by their colour. He found white, pale pink, deep pink, and red ones. Later observation showed that the pink and red ones became males, and the pale pink and white ones became females. He discovered something else too. The "Bunny Moths" are the females, and the male is much smaller, but has the power of full flight.

'Bunny Moth' on a wooden post.

It was the insect's preparations for pupation which really intrigued Lindsay. "They were most elaborate", he told me, "The caterpillar lives within the tree-root or stump, and when the time comes for pupation it eats its way out into daylight. Then it covers the hole with a webbing of silk and small pieces of bark. This harmonises with the tree-stump and defies detection. Then it crawls back along the tunnel, lining the cavity with felted silk, followed by a plug of gossamer for another two inches. This prevents any attack from the outside. This job done, it crawls down for about seven inches and chews a chamber out for itself, mixing the sawdust with saliva and plastering up every nook and cranny until the chamber is a solid wall of masonry. It then spins its own cocoon between the webbing and the masonry-wall, and pupates.

When the time comes for emergence the pupa breaks a softened part of the cocoon and moves its head and two rings outside. Like all wood-moths the rest of the body-segments have bristle grips, so the rest of the progress is easy.

"You've got to remember that all this time the moth is in its hard case", said Lindsay, "When it gets out to the dome at the end of the tunnel the pupal case splits and the moth emerges. Under the microscope the shell looks as though it had been fitted with a zip-fastener.

The moth's chief protection is its colour. Scientists call it "cryptic coloration", but Lindsay prefers to call it "protective camouflage".

I asked Lindsay whether the male was attracted to the female, or vice-versa. "That's a good one", he laughed. "I tried a few experiments at home, disguising what I believed to be the female scent with tobacco smoke. But I got the real answer when I put on a sports-coat, just back from the cleaners. I let a couple of females crawl all over me, and then "planted" them indoors, well away from the laboratory. I opened a cage with eight males in it. They flew all around me and then crawled all over my coat, and I had to pluck them off. I hung the coat up and brought the females back, placing them on a bench. As soon as I opened their cage, the males flew directly to the females, and two of them mated."

"I found", said Lindsay, "that after the eggs are laid under the bark of a samphire bush, the caterpillars take three weeks to hatch. They crawl to the top of the shrub and spin a white canopy over it. Then they let themselves down on a silk thread and begin their "boring" life."

Lindsay thinks that it's all in the day's work to turn in such field observations as this!

Until 1948 the life-history of *Xyleutes amphiplecta* (such was the name given to the "Bunny" by the taxonomists), was unknown. The dedicated patience of a country schoolmaster, aided by his class of nature-minded children, has given us this new knowledge.

AROUND THE STATES

AUSTRALIA

Heritage Commission

The Australian Heritage Commission Bill 1975 has been passed and the Heritage Commission has now come into existence. Following on the report of the National Estate, this represents a step forward in the legislative field. The functions of the Commission as laid down in the legislation are:

(a) to furnish advice to the Minister, either of its own motion or upon request made to it by the Minister, on matters relating to the national estate...

(b) to encourage public interest in, and understanding of, issues relevant to the national estate;

(c) to identify places included in the national estate and to prepare a register of those places...

It is also to concern itself with furthering training and education in fields related to the conservation, improvement and presentation of the national estate, to make arrangements for the administration and control of places that are given or bequeathed to the Commission, and to organise and engage in research or investigation.

Are You a Bird Photographer?

The National Index of Australian Birds has issued a Schedule of Submission form, a guide and a procedure for submissions for nature photographers wishing to submit photographs. This fine project, which is recording photographically all Australian birds, deserves the support of all nature photographers. Write to the Executive Officer, National Photographic Index of Australian Birds, c/- The Australian Museum, 6-8 College St., Sydney 2000, for information and copies.

VICTORIA

New Plant Pest Taking Over

The Conservation Council of Victoria and other conservationists are very concerned over the spread of South African Boneseed — a daisy-like plant with yellow flowers. The Council has issued posters and pamphlets on the pest (its address is 324 William Street, Melbourne 3000, telephone 329-5377). This magazine ran an article on boneseed (Vol. 5 No. 4) some years ago — back numbers still available, with photographs for easy identification. Anyone who suspects they have found an infestation should start pulling out seedlings at once; it spreads very quickly and the only other method of control is by spraying which destroys all other plants as well. Another very bad plant importation, the pest is also well established in N.S.W.

Concorde Arrives in Melbourne

Making an unspoken concession to the fact that Sydney-dwellers had more than enough of Concorde on its last visit, and don't want any more, the manufacturers chose Melbourne's Tullamarine Airport for the second try with the production model. The route chosen, which carefully avoided Aboriginal reserves, also bore witness to the effectiveness of Aboriginal protests against being subjected to sonic boom.

With members of Friends of the Earth, Ecology Action monitored independent noise-level measurements at Tullamarine with special consultants and measuring devices. Says Ecology Action's August Newsletter: 'Preliminary noise level figures indicate that the plane is no quieter than the prototype which came to Australia in 1972. Its noise levels are above those acceptable for airport environment.' Its September Newsletter carries full details.

The Australian Conservation Foundation in a press release mentioned a level of 138 EPNdb being recorded. This is far above even the noise level measured from the 1972 model and is only just below the noise level which causes actual physical pain.

The DCA measurement will probably show lower levels than this — the plane is apparently avoiding such noise levels above official recording equipment by reducing 'engine surge' at appropriate points (see SEARCH, Vol. 6 No. 4, J. L. Goldberg, 'Supersonic Transports: Some Environmental and Economic Aspects of their Operation').

With noise pollution being identified as one of the major problems of our time, why should we put up with Concorde operation at all?

Wildlife and Poison Baits.

The Fisheries and Wildlife Division has warned farmers that under the Game Act it is a punishable offence to poison protected wildlife in the course of eradicating pest species. They should get advice from the local Fisheries and Wildlife Officer before any poisoning operation is done, in places where protected wildlife is known to exist.

The State Director said valuable species had been needlessly destroyed because of careless baiting, selection of wrong poison, and haphazard methods of poisoning.

There is no doubt that pesticide poisoning often has these effects — and often results in farmers losing important wildlife which preys on the very pests they are trying to get rid of. Unfortunately few farmers are really concerned about protecting wildlife, and not many realise its value. Every State ought to try to educate farmers in the need for protecting wildlife and in proper methods of using pesticides, if they really have to do this. The Fisheries and Wildlife Division has appointed an officer to research the many problems associated with wildlife protection in relation to agriculture. This is a small step forward. What about other States following and extending this lead?

QUEENSLAND

There are rumoured proposals for a tourist resort on North Brook Island near Cardwell. This island is important as a breeding area for Torres Strait Pigeons, which are becoming locally scarce because of interference with breeding islands and mainland feeding grounds, and numbers have declined drastically this century. North Brook Island is a national park; but because of over-use and unwise exploitation on Green Island, local businessmen see North Brook as replacing it for tourist purposes. Queensland eventually could lose the splendid pigeons, if resorts and other developments take over their feeding and breeding areas.

New Service Inaugurated

The new National Parks and Wildlife Service, under the direction of Dr. G. W. Saunders who was formerly in charge of the Fauna Conservation Branch of the Department of Primary Industries, has got off to a start with the issue of a brochure with information about the Service, and about Queensland's system of National Park management, fauna reserves, fauna sanctuaries and fauna protection. An introduction by the Minister for Lands, Forestry, National Parks and Wildlife Service, Mr. K. B. Tomkins, states that the service also incorporates the concept of Environmental Parks.

As the brochure wisely says, 'At worst, we have despoiled and at best ignored the natural environment... We must try to understand natural processes and become aware of how completely we depend on them, and ask if our goals and our philosophies are in balance with life's basic needs.'

We will all wish the new Service well.

Fraser Island Inquiry

The number of submissions and the great amount of evidence presented to this inquiry — or rather, to the two inquiries, since after a High Court appeal by the miners the terms of reference were varied and a new inquiry set up — indicates how much of a flashpoint both for the miners and those interested in Fraser Island's conservation has become. Evidence continued well into September. Meanwhile, reports were that the miners were using the time to run a 24-hour operation in lease 109 — the main lease for which they were given approval by the Australian Government, and which contains very high sand-dunes and the lovely Lake Boemingen. We can only hope that the inquiry's report, whenever that is issued, will have some significance for future approvals of export of minerals from other leases both on Fraser Island and elsewhere.

A petition to both The Senate and the House of Representatives has attracted many important signatures, including that of Sidney Nolan, one of Australia's best known painters, who spent a formative few weeks of his youth on Fraser Island and has used it as background for two series of paintings.

The judgement by the High Court in the case of John Sinclair v. the Mining Warden at Maryborough establishes a very important precedent for conservationists everywhere. John Sinclair's appeal against the decision of the Mining Warden on five mineral leases on Fraser Island was on the grounds that the public interest had not been properly considered. In his judgement Sir Garfield Barwick said that 'the evidence given in support of the objection was very extensive, given by persons who appeared to be well-qualified in respect to the opinions they expressed, and was directed to the damage to the environment likely to be done by mining, to the irreversible nature of that damage and to the desirability of maintaining the terrain and its vegetative cover in

its virgin state'. The Supreme Court rejected Sinclair's appeal that the Warden had decided wrongly; but the High Court took the view that, so far from representing only the views of a 'section of the public', John Sinclair and F.I.D.O. in presenting evidence against mining produced material which 'did relate to a public interest not limited to the interests of a less than significant section of the public.'

The importance of the High Court's verdict is that Sir Garfield considered it plain from the provisions of the Act's regulations that the question of prejudice to the public interest or right is a 'paramount consideration in the process of determining whether a mining lease should or should not be granted', and that the Mining Warden had misconceived his duty in the case.

The judgment has thrown the legality of a number of other mining leases on the island — and perhaps elsewhere too? — into doubt, and it seems that the miners are back to taws on these. It is certainly a big step forward for the question of public interest in the granting or withholding of mining leases, and we should all be grateful to John and F.I.D.O. for their tenacious pursuing of the question right to the highest level. Congratulations F.I.D.O. and John Sinclair.

Feral Pigs.

The spread of wild pigs is giving great concern to conservationists. Important swampland habitat, necessary for the survival of wildfowl and such waterbirds as brolgas, is being rooted up and trampled by these pests, stream-banks are being laid open to erosion and food-plants destroyed. The Townsville Common, already encroached on by airport development and unwise levee-building, let alone by motor-cycles which leave the road and cause great disturbance among waterbirds, is heavily infested by wild pigs and the famous swampland shows bad deterioration on its fringes. The pigs follow the shrinking water in the dry season and increase the damage.

The control of wild pigs in national parks and reserves is a big problem. Shooting obviously can't be allowed, nor can poisoning. The agreement with Japan over the protection of migratory waders is a good one; but if their habitat is being increasingly destroyed not only by human action but by the pigs as well, it may turn out to be a 'dead letter'. The Wildlife Preservation Society of Queensland has written to the Minister for Environment drawing attention to the need for solving the pig infestation — which affects farmers as well as wildlife.

SOUTH AUSTRALIA

The annual report of the Nature Conservation Society of South Australia commends the Australian Government's grants for conservation groups, which have enabled the Society to start studies and research in five areas, with help from the tertiary students and others. The Society now has a full time project officer, also under the National Estate program. The report however points out that 'while National Park areas are being steadily acquired, the law is inadequate to safeguard existing land in private ownership until it is actually bought for National Park purposes,' and that areas of natural vegetation in the Mt Lofty Ranges are in danger of being cleared before they can be acquired.

With the highly unfortunate Budget cut in the amounts allocated by the Australian Government for purchase of land by the States, as national parks, it is not only in South Australia that we are in danger of losing many such areas to development before thay can be acquired.

TASMANIA

The Hydro-Electric Commission's plans now appear to cover all the State's major rivers in the beautiful south-west of the State, including the lower Gordon Valley, the King and Franklin and other rivers. The hope Tasmanians and Australians entertained of a major wilderness national park in the incomparable river-valleys, forests and gorges of the southwest is fading fast.

The HEC's ambitions might be justified in a country the size of Canada or the United States — in little Tasmania, whose industrial potential and population are never likely to approach those even of South Australia and Victoria, they amount to intentional cutting off of Tasmania's other option — to become Australia's most beautiful tourist State.

We don't know what it is with Tasmania. Should we change its name to Megalomania?

The Loss of Precipitous Bluff

The Supreme Court of Tasmania has dismissed the Conservation Trust's appeal against the mining of this remarkable area. Costs were awarded against the Trust, which can ill afford to pay. The Australian Conservation Foundation may be launching an appeal to help the Trust financially. Donations to the Foundation and its special appeals are tax-deductible. The Conservation Trust made a gallant fight and should not be penalised for its action in the public interest.

WESTERN AUSTRALIA

Woodchipping and Wildlife

The W.A. Forests Department, supporting the Manjimup woodchipping project, is under heavy criticism about its claim that wildlife disturbed by clear felling will not suffer because it can move into nearby uncut forests. Conservationists reply that many species will not be able to do this because of their dependence on their particular habitat, because 'niches' available in the nearby areas are already occupied, and because some species in any case do not survive the clear-felling. (Gliders for example, in research conducted in eastern States, do not appear to survive the loss of their particular forest area.)

What little research has been done into the effects of clear-felling on wildlife is not encouraging; to say the least. While some species such as marsupials increase in cleared areas, this is not necessarily a good thing: it may rather be a response to serious alteration of biological balance, and may trouble local farmers.

The W.A. Environmental Protection Authority's annual report makes it clear that the E.P.A. is not happy about the venture and its future. It points out that two years before the project was established the E.P.A. had drawn attention to the lack of research and knowledge of the effects of the proposal on the environment, and that it was introduced so hurriedly that the Authority had not enough time to give it full consideration.

NEW SOUTH WALES

Pollution Control, or Pollution Encouragement?

The decision of the State Pollution Control Commission to allow Coalcliff Colleries to use the Illawarra Escarpment for a coal-waste dump is tragic. 25 million tons of refuse are to be piled on this unstable escarpment, a far worse prospect than the previous Clutha proposal. The area is fine natural bushland, and apart from the ugliness and danger of the dump itself, any fires in the area could become an uncontrollable problem not only on the escarpment but nearby.

The Clutha proposal sparked off a very great deal of protest. This more disastrous one is apparently being accepted lethargically.

Children Lose

The Holroyd Flora and Fauna Society, the only society which has catered exclusively for children in nature education and environmental studies, has announced that it will have to close because of public apathy. Its founder and director, Mr. Parker, who says he has spent a great deal of time and money on leading its 106 child members on nature walks, and society projects, says he is bitterly disappointed that so few adults have been willing to help and that no local industry has sponsored his efforts. Now he can no longer carry on.

It is indeed sad that a society with such fine aims should get no support. Children get a great deal of mental and physical benefit from guided nature walks and education in the 'conservation ideal'. Others too should start thinking about taking up Mr Parker's lead and extending it for the community benefit.

OVERSEAS — U.S.A.

Early this year the U.S. Department of the Interior's Draft Environmental Impact Statement on the overall program for offshore drilling was strongly criticised by the State of New York. Major environmental shortcomings were said to include lack of identification of offshore areas specially vulnerable to oil pollution, inadequate geological and seismic information, lack of analysis of the environmental and socio-economic costs and/or benefits, lack of reference to the impacts and effects of major disasters like the Santa Barbara spill, and to the impact of wastes from drilling operations. The State summed up its reaction to the EIS on offshore impacts on the environment as 'an overwhelming lack of confidence.'

So far Australia has no environmental impact statement on offshore oil drilling. We would do well to commission one — and a better one than the U.S. Department of the Interior has apparently done.

The U.S. Environment Protection Agency in the U.S. now has new authority over pesticides. Before a new pesticide is registered, EPA must be satisfied that the product when used as the label recommends will not injure man, crops, animals or the environment and is effective against the pests it is directed against. Certain pesticides already in existence will be classified as 'restricted' and can only be used by certified applicators, who are tested before they are certified. There are other requirements directed to making sure that pesticides are safe and are properly used.

With reports of many deaths of fish and birds, Australia lags behind this legislation too.

LETTERS

The Australian Herpetological Society

This Society was formed to enable people interested in reptiles and herpetology to meet regularly together.

The aims of the Society are:—

(1) To collect and exchange information on all aspects of Australian reptiles and amphibians.

(2) To encourage the study of reptiles and amphibians — both in their natural state and in captivity.

(3) To promote a sane and reasonable attitude to reptiles and amphibians among the general public.

(4) To render all possible assistance to members engaged in field work.

To further these aims the Society:—

(1) Meets regularly each month in Sydney and Melbourne.

(2) Publishes a Society Journal known as "Herpetofauna" every three months.

(3) Maintains an extensive library of Herpetological books, journals and papers for use by members.

Enquiries should be directed to the Secretary:—

Ray Draper
10/174 George St.,
East Melbourne
Vic.
3002

The Tasmanian Association of Laboratory Technicians

I am writing to you on behalf of the above Association. As we have an increasing membership we have decided to produce a journal containing material of general scientific interest. The editorial staff are at present compiling the first edition of "Technicians in Touch" for distribution among our members.

May I ask if "Wildlife in Australia" or members of the Wildlife Preservation Society of Queensland would wish to contribute any previously published articles or original papers of relevance to Tasmania or practical biological techniques. We would of course fully acknowledge the source of all articles used and return all original papers.

As a science association we are particularly interested in the practical technical aspects of Biology ranging from taxidermy to field sampling methods to microtechniques. The field of interest is very wide.

Richard Bashford
Editor-in-Chief
P.O. Box 212
Wynyard
Tas.

Ed: This journal has no copyright in articles published. If any contributor wishes to submit articles from '*WILDLIFE*', to Mr. Bashford, we will be glad to see them republished.

Farm bushland

Just who should shoulder the blame for our present unsatisfactory conservation set up I wouldn't know — however the farmer is left holding a very sick baby.

Poor planning in the past by people in charge of land settlement, war service and otherwise, has put the farmer in a position where he is what could be termed a last line of defence for conservation. Without areas of healthy bush left on farms we cannot hope for success with conservation. If all the bush on farming land was fenced away from domestic stock and in a healthy condition the majority of our present day conservation, erosion and pollution problems would not be with us. I would say emphatically that in this State it's not the areas that have been cleared or the mining threat that will be our downfall, but the thousands of acres of bush left unfenced on farm and grazing properties and doomed to a slow death. There is a great need right now to fence these areas away from domestic stock. Without these green belts on our farms and grazing properties the national parks and reserves cannot be successful as they are too few and far between.

This is not as impossible as it may sound. Our Cranbrook property boasts of ⅓ (1,500 acres) left for shooters and conservation with eight miles of fencing doing nothing else but protecting bush from domestic stock. These areas are not considered waste but are part and parcel of sound farm management.

Frank Smith,
Cranbrook, W.A.

Native and Introduced Birds

In your June 1975 issue you quote from an article in the Audubon magazine which apparently decries the slaughter of starlings.

The Melbourne suburb in which I live is four miles from the city centre and has very few native trees. In the last two or three years the planting of such trees in gardens in the area has become increasingly common but there are still few native birds about. Three years ago I fed four white-naped honeyeaters for several weeks but they disappeared during the winter. I have seen only two since then. I saw a grey fantail on two occasions last year, and a magpie once this year. Several crows live in the area and seem to be becoming more common. Silvereyes are relatively common and I am now feeding twelve.

In contrast to this paucity of native birds, there are large numbers of sparrows, Indian mynahs, starlings and pigeons. The first three compete vigorously with the silvereyes for the food put out. I discourage these introduced birds as much as possible. Barbara Salter has said that they destroy the nests, eggs and young of the native birds. If this is true then it surely behoves us to do all we that can to deter and if possible destroy the introduced species.

There are many questions which arise which I cannot answer. Do the introduced birds depend on the exotic trees and shrubs for their survival? Does the existence of human dwellings and refuse make their eradication impossible? Is the presence of introduced grasses in lawns an important factor in the environment for introduced birds? I notice that the sparrows in particular eat the grass-seed, but they might eat native grass seed with the same enjoyment. When the native trees mature, will native birds establish territories in them regardless of the existence of the interspersed foreign environment?

The lad who lives next-door to me feeds the introduced birds with bread-crumbs; will this help to prevent the re-establishment of native birds?

(Dr.) Bruce Jones

(*Ed. We have answered Dr. Jones' letter as best we can but there are still many questions readers might like to discuss. The revulsion against the mass killing of starlings was of course because of the methods used.*)

Note: In our last issue we published a letter from Professor B.N. Richards and mentioned that we would be publishing part of an article by him reprinted from the Australian Forest Industries Journal. This has had to be stood over until our March issue.

Prehistoric artefacts

The letter from Merle Baldwin of Gilgai via Inverell published in your June number should not go unanswered. It is strange that the writer should comment on an article published in Vol. 8, No. 4 (December 1971) which concerns a N.S.W. Government Act that has since been amended by a further Act. However the letter raises vital issues of which many members of the public are not aware. The collection of prehistoric artefacts from Aboriginal sites is illegal in New South Wales. Even professional archaeologists have to apply for a permit from the National Parks and Wildlife Service for each excavation and surface collection research programme that they wish to undertake. Even were this not so, there is little point in overcrowding museums with thousands of indiscriminately collected artefacts. The collection of surface material should not now be undertaken without the observance of rigorous methodology which will permit the sampling of that surface material in a manner suitable for subsequent statistical analysis. Museums all over Australia are filled with countless artefacts which have been collected in the past with little or no attention to such methodology. One might also point out that many prehistoric Aboriginal sites are still sacred to modern Aborigines who understandably are increasingly critical of what they regard as the desecration of such places.

My main point is that surface collection also constitutes destruction of archaeological sites, and in N.S.W. is anyway illegal. Even if it were not, surface collection by the untrained amateur can do little to aid in the reconstruction of prehistory. If members of the public know of sites they should leave them alone and inform the National Parks and Wildlife Service.

Graham Connah,
Department of Prehistory and Archaeology,
University of New England,
Armidale, N.S.W. 2351

Black Swans on Norfolk Island

A few days ago two black swans were noticed on the convict-built dam in Watermill Valley, near the coast on Norfolk Island. As it seems to be the first time within living memory that black swans have been observed on the Island, much interest has been aroused among local residents, and many questions are being asked about the migratory habits of these birds. As no authoritative answers seem to be forthcoming, I should be grateful for any information you can supply. Would the swans be likely to have been blown off course by strong winds? Would they have set out from Australia or New Zealand?

Molly Owens, Norfolk Island.

[Black swans on the mainland move erratically. They are nomadic, and inland breeding birds tend to move towards the coast, so I would imagine these individuals overshot the mark and ended up at Norfolk. Of course, black swans also occur in New Zealand so they may have come from there.—ED.]

What Kills Cane Toads ?

Les Knuth's letter in September "Wildlife" suggests that cane toads in N.Q. are being killed by water rats, and it is interesting to find that Percy Trezise in his book "Last Days of the Wilderness" has come to the same conclusion. He says the remains of large cane toads lay around the waterhole (Quartz Creek) and it seemed that the bush rat had learned to hunt the toad as a food supply without falling victim to its poison. The bush rat killed the toad, then slit it open to eat the heart and liver, carefully avoiding the poison glands on the back of the toad's neck. Mr. Trezise says goannas are now extremely rare or non-existent in toad infested areas, and suggests the toad may be having a devastating effect on insect population. He believes the sugar industry which introduced the cane toad should be required to provide funds for its eradication.

I have relatives in the Biloela district who can vouch for the devastating effect the cane toad has on dung beetles introduced by the C.S.I.R.O. in an interesting bid to eliminate the buffalo and bush flies; another good reason for the toad's eradication.

E. Smith

The Lions Club of Sale is organising twelve months of activities around the theme of conservation and improvement of our environment.

As a starting point of our activities we are organising an Earth Day in Sale on Saturday, 8th November.

Our program for this Earth Day is:—

(1) A display of environmental project work by the local schools. All schools entering a display are to receive native trees to plant in their grounds.

(2) Conducted tours of the Lake Guthridge area and the Sale Common State Game Refuge.

(3) A 'Nature Trail' to visit areas where children have planted trees in previous years. All children walking the trail will plant a tree.

(4) Lectures and films on environmental topics.

We ask you to provide us with details regarding Earth Day and also names and addresses of any organisations who could assist us in 'environmental education' not only for our Earth Day but in the ensuing twelve months.

T. Aust
Secretary
Environmental Committee

(*Ed. We print this to show what good work can be done by local organizations. Perhaps more Lions and Rotary Clubs and others may like to do similar work.*)

Blue-winged Kookaburra

In your June issue there is an article by Ian Rowley on the kookaburra, in which he states that the blue-winged kookaburra, *Dacelo leachii*, is found in the north.

It may interest you to know there is a small colony of the blue-wings on the Brisbane River. We have not told many people because of the foul fiends with guns.

(Mrs.) B. Roberts

(*Ed. This species is quite often found well south of its main range, in isolated colonies. It is very sensible of our correspondent to keep such information quiet. We hope her little group of kookaburras survives and flourishes.*)

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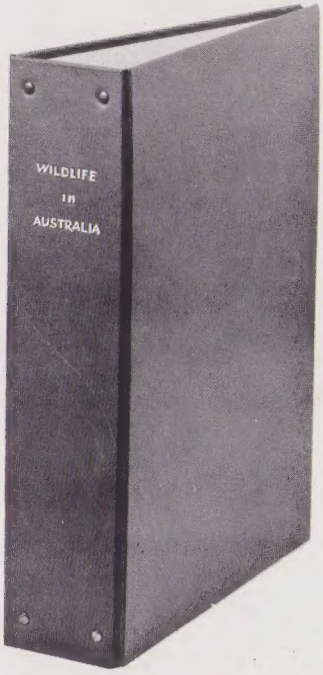

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